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CITY OF ABERDEEN

REPORT

BY THE

MEDICAL OFFICER OF HEALTH

J. PARLANE KINLOCH, M.D.

FOR THE YEAR

1924

TROPICAL DISEASES BUREAU
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PREFACE.

On the threshold of a new era in Public Health, it has seemed well to take stock of our resources.

The fresh prospect of securing the comprehensive control of disease and of attaining a higher standard of health is dependent on two main factors. In the first place, medical research has recently provided a great advance in our knowledge of the fundamental means by which disease may be prevented and health maintained. In this connection, the predominant contribution made by American workers is freely acknowledged. In the second place, the impending expansion of the statutory health services to embrace every requirement for preserving the health of the people will provide the machinery by which the newer knowledge can be generally applied.

As to our present resources, even the most cursory survey of the pages of this report will make evident the extensive nature of the health services which the Town Council have already made available. In describing these services, occasion has been taken to indicate briefly the methods which the Health Department has found to be most useful in preventing and curing disease.

A closer survey of the text will indicate the lines along which the Town Council will naturally develop their health services, but the report will have failed in its purpose if its perusal does not bring the profound conviction that the realisation of communal health demands an earnest endeavour on the part of every individual citizen.

Health cannot be given to the pampered. The newer knowledge, together with the increased facilities, will save lives and give health in a measure unrealisable in the past only when it is assimilated and practised by a people bringing to the achievement the same hardy and virile characteristics which formerly enabled the urbanised population to dominate and conquer an environment so poisoned as to be inimical to the proper chance of survival.

It is proposed in future to make a similar measure of the sanitary progress of the City at intervals of five years, and in the intervening years the annual reports will meet only minimum statutory requirements.

J. PARLANE KINLOCH,
Medical Officer of Health.

City of Aberdeen.

REPORT BY THE MEDICAL OFFICER OF HEALTH

For the Year 1924.

CHAPTER I.

INFECTIOUS DISEASES.

The importance of fevers is dependent in part on their being the classical examples of acute diseases. In fevers, the tissues of the body, while all reacting to the disease poison, are not necessarily injured beyond repair, and consequently disease is represented at a stage where treatment may secure recovery, as contrasted with older disease processes in which treatment can at most provide some amelioration of the more distressing symptoms arising in a body permanently disabled. A fever patient may be returned to life with his activities unimpaired; the patient with a sclerosed spine or fibrosed kidney can at most be taught how best to maintain the limited functions of his body.

Modern methods of investigation have provided a definite advance in the knowledge of the causes and nature of fevers and of the principles of treatment and prevention. We know now that the true causes of fevers are little animals and plants that gain entrance to the body, and there, by their presence and by the poisons they produce, originate the whole complex symptomatology of acute disease. We know also that at intervals these little animals and plants are suddenly permitted to assume great infecting power, and an epidemic begins, it rises to its height at a certain rate, and subsides in much the same manner.

Epidemic Theory.

Various theories have been advanced as an explanation of the causation and course of epidemics. It has been maintained that epidemics depend on a diminished resistance of the population to disease. Any agency which lowers tissue vitality, either locally or generally, probably increases susceptibility to disease. Some evidence that may support this theory is available. Thus, surface chilling, especially if localised and where the vaso-motor mechanism is sluggish, may act in this way and permit the onset of head colds and rheumatic affections. It would appear also that as a result of burns the resistance of the body is lowered to the infection of scarlet fever. There is reason also to believe that certain gastro-intestinal infections, such as enteric fever, cholera, and dysentery, most easily invade the body in the morning before food has been taken, when the stomach is alkaline after the night's rest, and so the disease organisms evade the destructive action of acid gastric juice. There is evidence also that faulty nutrition by lowering the resistance of the body may permit the onset of disease. Finally, there is evidence which suggests that residence in areas exposed to rain-bearing winds may increase susceptibility to pulmonary tuberculosis. But while these examples may explain certain infections in strictly limited groups of individuals, evidence has yet to be obtained of any factor capable of increasing in a rhythmic fashion the susceptibility of the general population to disease.

Again, it has been maintained that epidemics are controlled by the exhaustion of the susceptible persons among the population. But if this were so, then the decline of an epidemic would be much more rapid than its rise, and this is not the case in the vast majority of recorded epidemics. Not only so, but after the disappearance of an epidemic of a disease such as measles, to which practically every one is born susceptible, child after child is found who has meanwhile escaped infection. So also the nurse in a whooping-cough ward, who is herself developing measles, will infect on occasion all the susceptible children in her ward, while on another occasion all the susceptible children will escape taking measles although quite similarly exposed to infection.

Finally, it has been maintained that the varying infectivity of the disease organism is the chief factor determining an epidemic, and many of the complexities of epidemiology may be explained by this theory. According to this explanation, an organism causing an epidemic suddenly assumes great reproductive or infective power, a storing up of energy having gone on till the point of liberation is reached, and then the powers of infectivity or reproduction continuously decrease, the process being a rhythmic one of increase and decrease in the disease organism.

It is not commonly thought and not easily believed by many people that an epidemic is on the decline from the moment it begins. The powers of reproduction continuously decrease. It is this fact that gives the typical form to all epidemics, and unless this fact is realised no satisfactory basis for a theory of epidemic can be devised. This is the explanation of the bilateral symmetry of the epidemic curve of any typical epidemic. Farr had already given the solution as far back as 1864. If as he says, the second difference of the logarithm of the successive ordinates of the epidemic curves is constant, then it directly follows that the loss of infectivity is approximately in the ratio given by a geometrical progression. The point is more simply demonstrated by one of Brownlee's examples. If, as he says, the infectivity at the beginning of an epidemic be represented by 8, and the loss of infectivity at each period of time be $\frac{1}{2}$, then if 1 person were originally infected we would have the numbers infected at each period of the epidemic given by the terms—

$$1,\ 1 \times 8,\ 1 \times 8 \times (8 \times \tfrac{1}{2}),\ 1 \times 8 \times (8 \times \tfrac{1}{2}) \times (8 \times \tfrac{1}{4}),$$
$$1 \times 8 \times (8 \times \tfrac{1}{2}) \times (8 \times \tfrac{1}{4}) \times (8 \times \tfrac{1}{8}),\ \text{etc.},$$

or, 1, 8, 32, 64, 64, 32, 8, 1, so that the epidemic is symmetrical. This, as far as can be shown, is a property depending on the condition of the organism during the period of the epidemic, and not a property immediately depending on the environment of the organism. Of course the conditions which led to the storing up of germinal or infecting energy must be dependent on the environment very largely, but once the storage of energy has reached a certain point, liberation will ensue, and the next period of the organism's existence will be independent of the surroundings to a much greater extent than in the immediately preceding period. The change from moderate infectivity to that of high infectivity is also sudden, for were it not so the curve which represents the course of the epidemic would have a different form from that which it actually possesses in such cases. A similar biological activity is expressed in somatic life by periods of specially quick growth followed by periods of rest. In germinal life, it expresses itself by epochs of increase and energy. This rhythmic process of increase and decrease manifests itself in the minute animals and vegetables that cause disease as recurring epidemics of disease.

Finally, in considering the factors which determine the phenomena of epidemics, reference must be made to the interesting observations recorded by Flexner, Webster, and their co-workers in America, and by Topley and his co-workers in this country, regarding such factors as lability of the infecting organisms, variation in the resistance of the animal hosts and the effects produced by variation in dose, which would appear to play a part in epidemics induced experimentally. With the exception of certain premature conclusions induced by that limited knowledge of epidemiology which is a characteristic of bacteriologists, the observations made available by these workers form a valuable collection of data in this unexplored field of experimental medicine which, when greatly extended, will form the basis for future generalisations.

Classification of Diseases.

If it be accepted, meantime, that epidemics of disease follow a biological law, there is nevertheless no reason to believe that modern hygiene cannot limit their size. Through past years epidemics of typhus have spread unchecked in cities and throughout the country, but since it is now known that vermin are the means by which the disease is conveyed from person to person, some control of the disease is possible. The infectivity of the disease organism that causes typhus will continue through time to wax and wane, but the condition that will mainly determine the amount of the disease in epidemic times will be the verminous condition of the community. In a community wherein verminous conditions are diminished by half, the power for harm of the typhus organism, no matter what its infectivity may be, will be at the time correspondingly diminished.

The same is true of all diseases. Gradually, by means of modern methods of investigation, we are tracing the essential causes of disease to their sources.

Already there is the great group of diseases such as typhus, plague, and malaria that are known to be transmitted by lice or fleas or mosquitoes as the case may be. The control of these diseases is dependent in great part on the control of their insect hosts.

There is the great group of diseases such as typhoid fever, cholera, and dysentery, whose infection is now known to be confined in the excretions of the body, and so efforts at prevention and disinfection can now be accurately directed.

There are diseases such as malaria, syphilis and amœbic dysentery, each with its chemical cure.

There are diseases such as diphtheria, tetanus, epidemic meningitis, bacillary dysentery and Type I. pneumonia, for which a serum therapy has been devised.

There is the great group of diseases such as measles, whooping-cough and influenza, whose infection resides in the mucous membranes of the throat and respiratory tract, and whose infection spreads by the spray in coughing and talking.

And, lastly, there is the group of diseases such as enteric fever, cholera, plague, tetanus, diphtheria and scarlet fever, for which we have a specific prophylaxis, a definite prevention—a group of diseases of which small-pox is the classical example.

The classification of allied diseases in groups provides an orderly conception of the vast mass of acute disease with which we have to deal, and it is to be noted that according to a particular classification, diseases that in another classification would be widely divergent, are grouped together. Thus, enteric fever, which is grouped with typhus and relapsing fever for purposes of clinical description, is grouped for purposes of prevention with diseases whose infection is confined to the excretions of the body, while typhus and relapsing fever take their place in the group of insect-borne diseases.

In this chapter, a new grouping has been adopted for the various infectious diseases, in accordance with their specific prophylaxis and their modes of transference. The development in recent years of special or specific measures for the prevention of an increasing number of infectious diseases, and increased knowledge of modes of transmission, provide an advance towards the realisation of the conception of the comprehensive control of epidemic disease and warrant a classification based on methods of prevention rather than on clinical features. Accordingly, those diseases for which a specific or special prophylaxis has been devised are first described, and the remaining infections, grouped according to mode of transmission, are thereafter detailed.

The only addition to the group of compulsorily notifiable infectious diseases made during 1924 was that of spirochætosis ictero-hæmorrhagica, or acute infective jaundice, which became compulsorily notifiable in terms of the Public Health (Infective Jaundice) Regulations (Scotland), 1924.

Table I. gives the death-rate from each of the principal infectious diseases since the commencement of registration. In Table II. the number of cases and deaths for each disease is stated for the successive months of the year. Table III. gives the cases of infectious diseases notified in different sized houses; and Table IV. gives the morbidity and mortality of infectious diseases distributed according to ages and wards of the City. In Table V. the cases and deaths, together with the case-mortality or percentage of deaths to sicknesses in certain diseases, are supplied for each of the years 1914 to 1924, as also the averages for the 1904-1913 and 1914-1923 decades.

TABLE I.—ABERDEEN.—DEATHS AT ALL AGES FROM SELECTED CAUSES (per 100,000 of population).—*Years* 1856-1924.*

Year.	Small-pox.	Scarlet Fever.	Diphtheria and Croup.	Measles.	Whooping Cough.	Influenza.	Typhus Fever.	Typhoid Fever.	Tuberculous Diseases.		Dis. of Digest. Sys. (incl. Diarrhœa).	Cancer and other Malignant Diseases.	Bronchitis.	Pneumonia.	Dis. of the Circl. System. † excluding Cerebral Embolism & Thrombosis.
									Respiratory.	Other Tuberculous.					
1924, . . .	0	2	7	35	44	34	0	1	89	44	62	143	84	89	211
1923, . . .	0	2	5	26	3	7	0	2	80	42	86	131	67	75	195
1922, . . .	0	6	9	88	63	64	0	0	89	26	78	153	99	129	191
1921, . . .	0	5	23	1	1	18	0	0	89	17	94	129	96	98	193
1920, . . .	0	2	17	26	17	34	0	1	98	32	92	130	104	129	169
1919, . . .	0	2	20	1	20	126	0	3	88	43	66	124	100	120	170
Average 1919-1923,	0	3	15	28	21	50	0	1	89	32	83	133	93	110	184
1918, . . .	0	2	13	27	33	168	0	9	111	51	81	111	100	157	177
1917, . . .	0	7	11	52	29	22	0	1	116	57	104	112	101	118	175
1916, . . .	0	17	21	6	18	17	0	1	116	34	93	126	89	86	198
1915, . . .	0	86	30	90	43	21	0	1	135	45	126	129	123	141	200
1914, . . .	1	51	81	4	7	22	0	2	104	51	141	113	96	118	200
Average 1914-1918,	0	33	31	36	26	50	0	3	116	48	109	118	102	124	190
,, 1916-1920,	0	6	16	22	23	73	0	3	106	43	87	121	99	122	178
,, 1911-1915,	0·2	38	42	56	32	16	0	4	111	49	124	116	101	128	184
,, 1906-1910,	0	6	15	26	42	20	0	2	116	61	115	103	105	116	180
,, 1901-1905,	0·1	8	9	41	47	20	2 6	3·6	138	69	162	87	145	125	179
,, 1896-1900,	0	23	18	35	53	29	0·2	9	167	70	210	87	172	109	167
,, 1891-1895,	0·4	21	22	63	52	56	1·0	10	181	72	190	81	210	100	156
,, 1886-1890,	0·8	14	10	80	66	9	1·4	15	184	67	202	68	216	100	175
,, 1881-1885,	0·2	13	15	36	67	1	6	13	204	74	185	69	251	82	159
,, 1876-1880,	0·6	35	30	28	66	2	19	29	223	101	194	61	286	72	146
,, 1871-1875,	48	68	30	53	68	5	20	35	243	107	214	56	281	60	136
,, 1866-1870,	3·6	71	5	50	62	8	62	49	298	130	259	59	238	70	122
,, 1861-1865,	36	93	49	51	62	12	176		274	128	280	57	220	59	122
,, 1856-1860,	40	118	54	70	69	12	109		322	179	203	56	182	58	111

* Corrected for transferred deaths in 1904 and subsequent years. † From 1911 onwards.

TABLE II.—PROGRESS OF CERTAIN INFECTIOUS AND OTHER DISEASES IN YEAR 1924.

(Not corrected for transferred deaths.)

DISEASE.		1924.												Whole Year.
		Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	
A. Compulsorily Notifiable.														
Small-pox	Cases	...	...	...	...	...	...	...	...	...	....	1	...	1
	Deaths	...	...	...	...	...	...	...	...	...	...	...	...	...
Scarlet Fever	Cases	9	9	10	7	9	7	10	10	20	32	35	39	197
	Deaths	...	...	...	...	*1*	..	...	*1*	...	...	...	*1*	*3*
Diphtheria	Cases	26	17	22	17	10	21	14	15	20	42	43	39	286
	Deaths	...	...	*1*	...	..	*1*	*1*	...	*3*	*1*	*3*	*1*	*11*
Typhus Fever	Cases	...	...	...	...	...	...	...	...	...	...	...	...	...
	Deaths	...	...	...	...	...	...	...	...	...	...	...	...	...
Typhoid and Para-typhoid	Cases	...	2	...	2	1*	...	...	...	3*	...	1	...	9
	Deaths	...	...	...	...	..	...	...	...	...	...	...	*1*	*1*
Dysentery	Cases	1	...	...	...	...	1	...	...	...	...	...	...	2
	Deaths	...	...	..	...	...	...	...	...	...	...	...	...	...
Acute Poliomyelitis	Cases	...	...	1	2	...	...	...	1	2	...	...	...	6
	Deaths	...	...	...	...	...	...	...	...	...	...	...	...	...
Epidemic Cerebro-Spinal Meningitis	Cases	...	1	...	...	...	...	1	1	...	1	...	...	4
	Deaths	...	...	...	...	.	...	...	*2*	...	...	...	*1*	*3*
Epidemic Encephalitis	Cases	...	...	..	1	1	1	1	...	...	...	3	...	7
	Deaths	...	...	...	*1*	...	*1*	...	...	...	...	*1*	...	*3*
Acute Pneumonia	Primary—Cases	28	36	35	36	44	23	20	18	24	35	39	45	383
	Influenzal—Cases	3	8	10	1	2	2	...	1	4	7	25	14	77
Tubercle, Respiratory	Cases	32	23	26	28	30	21	19	27	12	17	21	29	285
	Deaths	*15*	*14*	*15*	*11*	*16*	*15*	*11*	*10*	*10*	*10*	*11*	*8*	*146*
Tubercle, Other	Cases	6	8	15	14	22	9	11	9	6	13	9	12	134
	Deaths	*4*	*1*	*5*	*9*	*12*	*7*	*5*	*8*	*5*	*9*	*4*	*5*	*74*
Erysipelas	Cases	9	8	8	9	6	6	8	8	5	3	11	11	92
	Deaths	...	...	...	...	...	...	*3*	...	*1*	...	...	...	*4*
Puerperal Fever	Cases	2	2	...	2	2	...	...	...	1	2	1	3	15
	Deaths	*2*	*1*	...	*1*	*2*	...	...	...	..	*1*	...	*1*	*8*
Ophthal. Neonatorum	Cases	9	5	4	3	4	8	8	2	8	8	8	2	69
Malaria	Cases	...	1	2	...	...	..	..	...	...	...	...	...	3
	Deaths	...	...	...	...	...	...	...	...	...	...	..	...	...
†Infective Jaundice		...	...	...	...	...	...	...	...	...	...	...	0	0
B. Not Compulsorily Notifiable.														
‡Measles	Cases	25	48	96	221	519	284	40	24	12	33	56	130	1488
	Deaths	...	*2*	...	*9*	*30*	*9*	*3*	...	...	*1*	...	*2*	*56*
German Measles	Cases	2	...	1	..	...	1	1	...	4	10	33	59	111
	Deaths	...	...	...	..	..	...	...	...	...	...	...	...	...
‡Whooping Cough	Cases	57	66	71	82	102	94	22	193	163	275	333	254	1712
	Deaths	...	...	*1*	*1*	*4*	*2*	*5*	*3*	*6*	*12*	*12*	*25*	*71*
Chicken Pox	Cases	50	46	41	41	21	12	7	8	15	29	23	25	318
	Deaths	...	...	...	...	...	...	...	...	...	...	...	...	...
TOTAL	Cases	259	280	342	466	773	490	162	317	299	507	642	662	5199
	Deaths	*21*	*18*	*22*	*32*	*65*	*35*	*28*	*24*	*25*	*34*	*31*	*45*	*380*
Influenza	*Deaths*	*1*	*3*	*3*	*2*	*1*	*1*	*0*	*0*	*2*	*4*	*3*	*2*	*22*
Do. and Pneumonia,	*do.*	*2*	*1*	*2*	*1*	*0*	*1*	*0*	*0*	*0*	*4*	*10*	*8*	*29*
Do. and Bronchitis,	*do.*	*1*	*0*	*0*	*0*	*1*	*0*	*0*	*0*	*0*	*0*	*1*	*0*	*3*
Pneumonia	*Deaths*	*8*	*13*	*19*	*16*	*20*	*9*	*5*	*7*	*10*	*10*	*15*	*17*	*149*
Bronchitis	*do.*	*18*	*14*	*19*	*14*	*9*	*5*	*3*	*5*	*9*	*11*	*23*	*19*	*149*

* 1 case of Para-typhoid. † Compulsorily notifiable from 26th December, 1924.

‡ Compulsorily notifiable from 1881 to 1903 ; now reported mainly by School Attendance Officers.

Table III.—Aberdeen.—Cases of Infectious Diseases Notified in different sized Houses in Year 1924.

Disease.	Number of Cases in Houses of					No. of Cases in Institutions, &c.	Case Rate per 1,000 Houses of				
	1 Room	2 Rooms	3 Rooms	4 Rooms	5 Rooms and upwards		1 Room	2 Rooms	3 Rooms	4 Rooms	5 Rooms and upwards
A. Compulsorily Notifiable.											
Small-pox,	...	..	...	...	...	1	...	...	...	...	...
Scarlet Fever,	23	71	59	18	13	13	7·3	5·4	5·6	4·3	2·6
Diphtheria,	20	107	76	25	19	39	6·3	8·1	7·2	6·0	3·8
Typhus Fever,	...	...	...	...	...	...	...	...	...	...	...
Typhoid or Enteric,	...	1	3	...	1	2	...	0·1	0·3	...	0·2
Para-Typhoid "B,"	...	...	1	...	1	...	...	...	0·1	...	0·2
Dysentery,	...	...	...	...	1	1	...	...	...	...	0·2
Acute Poliomyelitis,	1	3	1	1	...	...	0·3	0·2	0·1	0·2	...
Epidemic Cerebro Spinal-Meningitis,	1	1	2	...	...	...	0·3	0·1	0·2	...	...
Epidemic Encephalitis,	1	...	3	...	2	1	0·3	...	0·3	...	0·4
Acute Primary Pneumonia,	67	153	112	19	19	13	21·1	11·6	10·6	4·5	3·8
Acute Influenzal Pneumonia,	4	22	28	8	13	2	1·3	1·7	2·7	1·9	2·6
Respiratory Tuberculosis,	42	95	83	27	20	18	13·2	7·2	7·9	6·4	3·9
Other Tuberculosis,	20	57	40	9	4	4	6·3	4·3	3·8	2·1	0·8
Erysipelas,	7	37	25	11	6	6	2·2	2·8	2·4	2·6	1·2
Puerperal Fever,	3	8	2	...	...	2	0·9	0·6	0·2	...	...
Ophthalmia Neonatorum,	19	34	13	2	1	...	6·0	2·6	1·2	0·5	0·2
Malaria,	...	1	1	1	..	...	...	0·1	0·1	0·2	..
B. Not Compulsorily Notifiable.											
Measles,	210	751	362	78	83	4	66·2	56·9	34·3	18·6	16·4
German Measles,	17	54	20	10	8	2	5·4	4·1	1·9	2·4	1·6
Whooping Cough,	333	915	334	83	39	8	105·0	69·4	31·7	19·8	7·7
Chicken Pox,	43	148	69	32	20	6	13·6	11·2	6·5	7·6	3·9
Total,	811	2458	1234	324	250	122	255·7	186·4	117·1	77·1	49·5

TABLE IV.—ABERDEEN.—MORBIDITY AND MORTALITY OF INFECTIOUS DISEASES DURING 1924.

(Distributed according to Ages and Wards of City.)

DISEASE.		NO. OF CASES AND DEATHS AT VARIOUS AGE-PERIODS.						CASES AND DEATHS PER 10,000 OF POPULATION IN EACH WARD OF CITY.*										
		Under 5 years	5-15 years	15-25 years	25-45 years	45+ years	All Ages.	Woodside.	St. Machar.	St. Andrew's.	St. Clement's.	Greyfriars.	St. Nicholas.	Rosemount.	Rubislaw.	Ruthrieston.	Ferryhill.	Torry.
Population (in thousands), Census 1921		...	...	...	...	...	...	9·5	14·3	17·6	11·2	13·7	14·5	16·6	19·0	16·4	14·7	11·3
A. Compulsorily Notifiable.																		
Small-pox	Cases	...	...	1	...	...	1	...	...	...	0·9	...	...	...	..	...	...	...
	Deaths	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Scarlet Fever	Cases	72	105	17	3	...	197	16	12	17	13	15	11	14	5	20	6	8
	Deaths	1	2	...	...	...	3	...	...	...	...	0·7	0·7	...	...	...	0·7	...
Diphtheria......	Cases	103	100	63	16	1	286	18	28	22	37	17	18	15	11	14	4	24
	Deaths	8	3	...	..	...	11	...	...	...	2	1	3	0·6	...	0·6	...	0·9
Typhus Fever	Cases	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Deaths	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Typhoid and Para-Typhoid	Cases	...	...	1	6	2	9	2	...	1	0·9	...	...	0·6	...	0·6	0·7	0·9
	Deaths	...	...	...	1	...	1	1	...	...	...	...	...	...	...	...	...	...
Dysentery	Cases	...	...	...	2	...	2	...	...	...	0·9	...	...	...	...	...	0·7	...
	Deaths	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Acute Poliomyelitis	Cases	4	2	...	...	...	6	...	0·7	0·6	0·9	...	..	...	0·5	0·6	0·7	...
	Deaths	...	...	...	...	...	...	...	...	..	...	...	...	...	..	...	...	...
Epidemic CerebroSpinal-Meningitis	Cases	2	...	2	...	...	4	...	..	0·6	0·9	0·7	. .	0·6	...	...	...	...
	Deaths	2	...	1	...	...	3	...	...	0·6	0·9	0·7	...	...	...	...	...	...
Epidemic Encephalitis	Cases	1	4	1	1	..	7	1	1	...	0·9	0·7	...	0·6	0·5	...	...	...
	Deaths	...	2	...	1	...	3	...	0·7	...	0·9	...	..	...	0·5	...	...	...
Acute Pneumonia—																		
(*a*) Primary ...	Cases	181	45	48	44	65	383	28	27	23	33	44	33	24	8	12	15	30
	Deaths	64	4	8	11	34	121	9	8	6	7	16	9	11	3	4	5	7
(*b*) Influenzal	Cases	5	5	18	21	28	77	2	10	5	2	1	1	4	5	7	2	15
	Deaths	2	...	3	7	17	29	...	1	4	...	...	1	0·6	4	3	0·7	4
Tuberculous Diseases—																		
(*a*) Respiratory	Cases	18	47	60	98	62	285	13	14	19	21	34	26	20	7	12	18	18
	Deaths	5	2	29	56	51	143	9	8	9	4	13	12	11	8	8	7	8
(*b*) Other	Cases	63	40	16	9	6	134	5	11	7	9	15	12	6	4	6	10	11
	Deaths	42	10	5	6	7	70	1	8	3	6	6	8	5	3	3	2	4
Erysipelas	Cases	3	4	11	26	48	92	7	10	5	4	10	6	7	3	3	7	2
	Deaths	1	...	...	...	3	4	...	0·7	...	...	...	0·7	0·6	...	...	...	0·9
Puerperal Fever ...	Cases	...	...	5	10	...	15	.	0·7	0·6	5	...	0·7	0·6	0·5	...	1	2
	Deaths	...	...	3	5	...	8	...	0·7	0·6	4	...	...	...	0·5	...	...	...
Ophthalmia Neonatorum	Cases	69	...	..	...	...	69	2	5	7	4	12	6	3	1	1	2	6
Malaria	Cases	...	...	1	2	...	3	...	..	...	...	0·7	...	...	0·5	...	0·7	...
	Deaths	...	..	...	...	...	..	...	...	...	...	...	...	...	...	...	...	..
B. Not Compulsorily Notifiable																		
Measles	Cases	823	646	15	4	...	1488	108	94	139	160	193	93	73	26	56	63	65
	Deaths	56	...	...	...	...	56	1	2	6	7	10	2	2	...	0·6	5	4
German Measles ..	Cases	24	81	2	3	1	111	...	6	10	21	20	6	3	4	4	2	2
	Deaths	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Whooping Cough......	Cases	1092	617	2	1	...	1712	98	99	125	258	198	128	84	32	74	70	76
	Deaths	71	...	...	...	...	71	2	3	5	11	9	6	3	1	3	2	6
Chicken Pox...	Cases	149	163	5	..	1	318	11	15	32	13	28	23	31	6	21	12	23
	Deaths	...	...	...	..	...	..	...	...	...	..	...	...	...	...	...	...	...
Total	Cases	2612	1859	268	246	214	5199	311	333	414	585	589	364	286	114	231	215	283
	Deaths	252	23	49	87	112	523	23	32	34	43	56	42	34	20	22	22	35

* Deaths occurring in Hospitals are assigned to the Ward of the City from which the cases were originally removed.

TABLE V.—ABERDEEN.—MORBIDITY AND MORTALITY OF INFECTIOUS DISEASES (*Excluding Tuberculosis*)

DURING EACH YEAR FROM 1914 TO 1924.

(*Not corrected for transferred deaths.*)

DISEASE.		1924	1923	1922	1921	1920	1919	1918	1917	1916	1915	1914	ANNUAL AVERAGE.	
													1914 to 1923.	1904 to 1913.
A. Compulsorily Notifiable.														
Small-pox,	No. of Cases, ...	1	1	0	0	0	0	8	0	0	0	6	1·5	0·4
	No. of Deaths, ...	0	0	0	0	0	0	0	0	0	0	1	0·1	0
	Percent. of Deaths	0	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*16·7*	6·7	0
Scarlet Fever, ...	No. of Cases, ...	197	271	310	706	409	270	290	283	917	1873	1552	688·1	788·1
	No. of Deaths, ...	3	4	9	8	4	4	3	11	27	142	83	29·5	16·8
	Percent. of Deaths	1·5	*1·5*	*2·9*	*1·1*	*1·0*	*1·5*	*1·0*	*3·9*	*2·9*	*7·6*	*5·3*	4·3	2·1
Diphtheria,	No. of Cases, ...	285	189	292	733	560	561	357	338	572	675	1627	590·4	485·5
	No. of Deaths, ...	11	8	14	36	29	32	21	18	34	51	132	37·5	32·3
	Percent. of Deaths	3·8	*4·2*	*4·8*	*4·9*	*5·2*	*5·7*	*5·9*	*5·3*	*5·9*	*7·5*	*8·1*	6·4	6·7
Typhus Fever, ...	No. of Cases, ...	0	0	0	0	0	0	0	0	0	0	0	0	13·5
	No. of Deaths, ..	0	0	0	0	0	0	0	0	0	0	0	0	2·3
	Percent. of Deaths	0	*0*	*0*	*0*	0	*0*	*0*	*0*	*0*	*0*	*0*	0	17·0
Typhoid and Paratyphoid,	No. of Cases, ...	9	21	8	7	8	23	102	1	10	13	15	20·8	36·4
	No. of Deaths, ...	1	3	0	0	2	5	14	1	2	1	3	3·1	5·4
	Percent. of Deaths	11·1	*14·3*	*0*	*0*	*25·0*	*21·7*	*13·7*	*100*	*20·0*	*7·7*	*20·0*	14·9	14·8
†Dysentery,	No. of Cases, ...	2	0	6	24	17	7	...	...	...	...	...	...	...
	No. of Deaths, ...	0	0	1	7	4	0	...	.	...	..	...	...	...
*Acute Poliomyelitis,...	No. of Cases, ...	6	0	9	8	5	1	2	10	79	2	2	11·8	...
	No. of Deaths, ...	0	0	0	2	0	1	1	0	4	0	0	0·8	...
Epidemic Cerebro-Spinal Meningitis,	No. of Cases, ...	4	5	3	5	3	12	4	2	5	19	1	5·9	...
	No. of Deaths, ...	3	3	2	3	1	10	4	2	2	14	1	4·2	...
‡Epidemic Encephalitis	No. of Cases, ...	7	0	0	3	...	...	...	...	...	...	...	...	...
	No. of Deaths, ...	3	0	0	1	...	...	...	...	...	..	...	...	...
†Acute Pneumonia,	Primary, No. of Cases,..	383	335	404	354	393	109	...	...	.	...	...	...	...
	Primary, No. of Deaths,	121	107	179	131	190	50	...	...	...	...	...	...	...
	Influenzal, No. of Cases,..	77	17	141	56	87	15	...	...	...	..	...	...	...
	Influenzal, No. of Deaths,	29	6	64	10	32	1	..	...	...	...	...	...	...
Erysipelas,	No. of Cases, ...	92	110	110	170	158	141	102	129	125	198	395	163·8	185·2
	No. of Deaths, ...	4	4	11	4	6	2	6	9	4	7	14	6·7	5·6
Puerperal Fever, ...	No. of Cases, ...	15	15	16	13	13	10	8	12	11	11	24	13·3	9·9
	No. of Deaths, ...	8	8	13	6	5	1	6	8	5	8	15	7·5	5·7
*Ophthalmia Neonatorum	No. of Cases, ...	69	63	47	100	112	99	39	42	40	40	47	62·9	...
†Malaria, ...	No. of Cases, ...	3	3	5	55	138	77	..	...	...	...	...	...	...
	No. of Deaths, ...	0	0	0	1	1	0	...	...	...	..	...	...	...
†Trench Fever, ...	No. of Cases, ...	0	0	0	0	2	4	...	...	...	...	...	...	...
	No. of Deaths, ..	0	0	0	0	0	0	...	...	...	...	...	..	...
¶Infective Jaundice		0	...	...	...	...	...	...	...	...	...	...	...	...
B. Not Compulsorily Notifiable.														
‖Measles, ...	No. of Cases, ...	1488	594	3684	44	1072	306	788	1800	183	1750	69	1029·0	1408·2
	No. of Deaths, ..	56	41	142	2	41	2	43	86	10	147	6	52·0	64·8
	Percent. of Deaths	3·8	*6·9*	*3·9*	*4·5*	*3·8*	*0·7*	*5·5*	*4·8*	*5·5*	*8·4*	*8·7*	5·1	4·6
German Measles,	No. of Cases, ...	111	2	11	4	73	42	21	357	9	4	8	53·1	...
	No. of Deaths, ..	0	0	0	0	0	0	1	2	0	0	0	0·3	...
‖Whooping Cough, ...	No. of Cases, ...	1712	87	1444	305	325	713	777	956	307	1068	116	609·8	846·3
	No. of Deaths, ...	71	5	101	2	28	31	54	48	29	70	12	38·0	71·1
	Percent. of Deaths	4·1	*5·7*	*7·0*	*0·7*	*8·6*	*4·3*	*6·9*	*5·0*	*9·4*	*6·6*	*10·3*	6·2	8·4
§Chicken Pox, ...	No. of Cases, ...	318	255	46	725	256	...	...	...	...	...	...	...	...
	No. of Deaths, ...	0	1	0	3	0	...	...	...	...	...	...	...	...

* Notification commenced May, 1913. † Notification commenced Aug., 1919. ‡ Notification commenced Aug., 1921.

§ Compulsorily notifiable from May, 1920, to Sept., 1921, and from July to December, 1923.

¶ Compulsorily notifiable from 26th December, 1924. ‖ Compulsory notification ceased February, 1903.

DISEASES WITH A SPECIFIC PROPHYLAXIS.

The classical example of a disease having a specific prophylaxis is small-pox; and other diseases for which special preventives have been devised include rabies, typhoid and para-typhoid fevers, cholera, plague, the venereal diseases, ophthalmia neonatorum, tetanus, diphtheria, and scarlet fever.

As regards the prevention of diphtheria, a great advance on the method of passively and temporarily immunising against the disease by means of diphtheria antitoxin has been made by the development of methods for testing susceptibility to the disease by Schick testing and by actively immunising the susceptible by means of toxin-antitoxin. So, also, the recent devising of methods for testing susceptibility to scarlet fever, for producing an active immunity to this disease, and for providing a curative serum, is a great achievement. It has long been known that streptococci are commonly present in the throats of scarlet fever patients, but the application of methods analogous to those devised for securing diphtheria prophylaxis to the investigation of the problem of scarlet fever and its prevention by Drs. George and Gladys Dick has demonstrated that a particular variety of streptococcus actually causes scarlet fever, that the symptoms of the disease are caused by the toxin of this organism, that the tissue cells of a convalescent patient provide a protective antitoxin, and that scarlet fever may be produced by experimental inoculation with hæmolytic streptococci and cured with an antitoxic serum. It is not contended that the value of these methods of immunising against diphtheria and scarlet fever has been proved statistically—such proof will not be available for an indefinite number of years—but the utilisation of these preventive procedures is abundantly justified on the ground of their inherent reasonableness.

During the past year, considerable progress has been made in the investigation and practical application of preventive immunisation to diphtheria and scarlet fever in the City Hospital. Meantime, the feasibility of employing a mixed vaccine containing diphtheria toxin-antitoxin and scarlatinal streptococcus toxin to secure concurrent active immunisation against diphtheria and scarlet fever is being investigated with a view to its intensive application to the prevention of diphtheria and scarlet fever in Aberdeen.

Small-pox.

On two occasions during the year small-pox gained admission to the City.

On the first occasion, a lady from Yorkshire, who was spending her summer vacation at Rosehearty, and who travelled from Hull to Aberdeen and back by steamship, developed an illness at Rosehearty, which, after her return home, was found to be small-pox. The date of onset of illness at Rosehearty indicated that the infection had been contracted in Yorkshire. The initial symptoms at Rosehearty had been mild, and no doctor had been called to see her. It was ascertained later that the small-pox rash was well developed on this patient when she arrived in Aberdeen from Rosehearty on the 13th September to join the ship on her way to Hull; and while in Aberdeen the patient had visited a shop and picture house in Union Street. A circular letter was at once addressed to the medical practitioners of the City informing them that a case of small-pox had passed through the City. The crew of the steamship, on returning to Aberdeen on 19th September, were all re-vaccinated (two of the crew who had given personal service to the patient being retained in quarantine), every part of the ship to which the small-pox patient had access was thoroughly disinfected, and re-vaccination was offered to all passengers on board. On the further return of the steamer to Aberdeen on 26th September, it was found that all the re-vaccinations of the crew had been successful, with the exception of three cases, and in these three cases it was probable that they had responded to vaccinia with an accelerated reaction. The three cases were quarantined until beyond the incubation period of small-pox. The carriages of the train in which the small-pox case travelled from Fraserburgh to Aberdeen on 13th September were also traced and disinfected. Some 800 protective vaccinations and re-vaccinations were carried out by the County Medical Officer at Rosehearty and Fraserburgh. In all the circumstances the City was singularly fortunate in that no cases of small-pox arose from this case in this area. It was ascertained that another lady, who travelled with the small-pox patient on the steamship from Aberdeen to Hull, had later developed small-pox.

On the second occasion, an undoubted case of small-pox in a trawl engineer, aged 20 years, who had never been vaccinated, was admitted to the City Hospital on 27th November, the small-pox being of the mild variety, or alastrim type, that has characterised most of the small-pox that has been epidemic in England and Wales during the past two years. It was ascertained later that the patient had been infected at his home in Scarborough, which he left on 10th November, and he sickened with headache, pyrexia, sweating and pain in the back and limbs, on 26th November, when the trawler on which he served entered the Port of Aberdeen. On 27th November, he attended at the Royal Infirmary, and in view of the epidemic prevalence of influenza in Aberdeen and the absence of small-pox, he was regarded as a case of influenza, and was advised to proceed to the City Hospital, where he was admitted as such. The pyrexia and other symptoms subsided on 29th November, and on 1st December the rash appeared—a rash which formerly would have been regarded as a small-pox rash, greatly modified by previous vaccination, viz., the successive stages of the rash being lost by rapidity of development and partial abortion, giving, to some extent, the appearance of "cropping" of chicken-pox. Secondary fever was absent. In view of the fact that no attempt had been made at any time to vaccinate this patient, the case, while being regarded administratively as a case of small-pox, was diagnosed "suspected small-pox"; but after inquiry at the Medical Officer of Health of Scarborough, it was ascertained that the patient's house there was full of small-pox, one of the cases being the patient's wife. The patient failed entirely to respond to the vaccinia test, and the Paul test was definitely positive, thus confirming the diagnosis. The trawler, in which the man sickened, had again proceeded to sea on 27th November, and on inquiry at the owners in Newhaven it was ascertained on 2nd December that the trawler was at that time lying at the West Pier, Leith. The Medical Officer of Health of Edinburgh and the Board of Health were informed of these circumstances, and steps were taken to secure re-vaccination of the crew and to keep them under observation until such time as the incubation period of small-pox had elapsed. All known contacts in Aberdeen were successfully re-vaccinated, and the necessary disinfection was secured. Again, fortunately, no secondary cases of small-pox arose from this case in Aberdeen.

Vaccinia.

The passing of the Vaccination (Scotland) Act, 1907, permitted exemption from vaccination of those children whose parents declared formally that they had conscientious objections to their vaccination. The accompanying table (Table VI.) shows the percentage of the total surviving children at the end of the calendar year following the year of birth who have thus remained unvaccinated, in each year from 1907 to 1923. It is found that the number of conscientious objectors continued to increase year by year from 1907 to 1913. In 1907, the proportion of children thus escaping vaccination was only 2·1 per cent. of the children born, and this percentage steadily increased year by year until 1913, when 14·4 per cent. were unvaccinated. Fortunately, this percentage of 14·4 for 1913 proved to be the highest proportion that has yet been recorded since the Act produced the conscientious objector. During the 6 years 1914-1919, the percentages ranged from 10·5 to 12·3. In 1920, the percentage fell to 6·4, this fall being due to the fear of infection that the Glasgow epidemic of small-pox had aroused, and in particular to the vaccination propagandism instituted in this connection by the Health Department. In 1921 and 1922, the percentage again rose to 9·4 and 9·6 respectively; and in 1923, it fell to 8·6.

The desirability of securing efficient protection from small-pox by vaccination and re-vaccination should be of special interest to the community at the present time, in view of the wide-spread incidence of small-pox of the mild variety, or alastrim type, which has been prevalent in England and Wales during the past two years, when in 1923 there were 2,485 cases, and in 1924 almost 4,000 cases. It may be stated that Scotland has been singularly fortunate in its freedom from this mild variety of small-pox, which has been of so serious import to England; but the continued immunity of Scotland cannot be taken for granted. On the contrary, the disease has appeared twice in the City during the year and may reappear in Aberdeen at any time, and although the precautions taken on the discovery of the above-mentioned imported cases of small-pox may have prevented the spread of the disease, nevertheless the very mildness of the type of small-pox at present prevalent may permit it to escape attention until the City is confronted with a general epidemic. As with severe small-pox, so with this mild type of the disease, successful vaccination and re-vaccination after a period of seven years provide a certain prevention of the disease.

TABLE VI.—ABERDEEN.—STATEMENT OF NUMBER OF DECLARATIONS OF CONSCIENTIOUS OBJECTION TO VACCINATION.

Year.	Registered Births.	Deaths before Vaccination	Survivors.	Con-scientious Objectors.	Per-centage.	Year.	Registered Births.	Deaths before Vaccination.	Survivors.	Con-scientious Objectors.	Per-centage.	Year.	Registered Births.	Deaths before Vaccination.	Survivors.	Con-scientious Objectors.	Per-centage.
1907	4504	470	4034	84	2·1	1913	3872	467	3405	491	14·4	1919	3481	357	3124	357	11·4
1908	4450	511	3939	219	5·6	1914	4041	481	3560	413	11·6	1920	5010	500	4510	290	6·4
1909	4492	526	3966	339	8·5	1915	3837	483	3354	412	12·3	1921	4326	457	3869	364	9·4
1910	4300	448	3852	362	9·4	1916	3627	401	3226	345	10·7	1922	4038	398	3640	348	9·6
1911	4028	478	3550	406	11·4	1917	2966	326	2640	347	13·1	1923	3847	317	3530	305	8·6
1912	4152	511	3641	478	13·1	1918	2817	351	2466	260	10·5						

Vaccinal Procedure.—With reference to the method by which vaccine lymph is introduced into the skin, it is now generally admitted that the best effect is obtained by making two scratches one inch long and about one inch apart. The vaccinia virus is first placed upon the skin in two small droplets about an inch apart. The point of the needle is then moistened in the droplet, and as the scratch is made the needle carries the virus along with it into the little wound. With the flat of the needle the virus should be gently rubbed (not ground) into the scratch. This is not to cause any unnecessary irritation, so as to avoid attracting infections.

It is now generally admitted that scarification, or cross scratching, is a wrong procedure. The objection to scarification is that this method produces a relatively large abraded surface, which is soon covered by a hard crust of serum and blood through which the eruption cannot pierce. The vesicles form a central ring round the scarified area leaving a central irritated wound to invite infection.

The use of any kind of a shield as a vaccination dressing is to be deprecated. The employment of such a shield tends to prevent evaporation, to retain heat, moisture or discharges, with a consequent softening of the vesicles, to obstruct lymphatic drainage, to produce hyperæmia, and to create conditions apparently favourable for the development of bacterial invasion. If the pustular area breaks down or the crust comes off and shows evidence of secondary infection, the wound requires frequent antiseptic dressing.

Children commonly receive their primary vaccination at the age of six months, and if re-vaccination is to be neglected in early school life full primary vaccination at this age probably gives the best results. This is due to the fact that any vaccinal immunity which the child has had at birth from its mother has decayed by the end of six months, and that children receiving vaccination of such extent that the area of vesiculation is not less than half a square inch, as laid down in paragraph 7 of the third schedule of Article 8 of the Vaccination Order of 1898, develop the greatest and most enduring immunity. It may be mentioned in passing that the vesiculation obtained from two scratches an inch long gives a total area of not less than half a square inch. Parents have been accustomed in the past to their children receiving such extensive vaccination.

Alternative Vaccinal Procedure.—There are certain objections to this extensive vaccination of children at the age of six months. At that age-period a child is undergoing a profound developmental change with the commencement of teething and increased pancreatic activity; and to superimpose the additional strain of an acute infectious disease such as vaccinia on the top of this developmental change cannot be regarded altogether with equanimity, even although, as has been pointed out in my previous annual report, no evidence has been obtained that vaccination as thus practised has a harmful effect upon the child's future well-being. Any immediate effect prejudicial to the health of a child caused by the disturbance of vaccination at the age of six months can be obviated and protection from small-pox secured if parents can be persuaded to adopt the following vaccination and re-vaccination procedure.

In the first place, *the child when a week old is vaccinated on the arm with the smallest single site insertion compatible with a successful take.* Vaccinia developing in this way is extremely mild and causes no discomfort whatsoever to the infant, and no scarring results from this procedure. The immunity from small-pox thus secured is, however, of shorter duration than the immunity provided by the full vaccination procedure at the age of six months as already described, and while children thus mildly vaccinated in the first week of life are protected during the pre-school years, re-vaccination at the school age must be procured if the danger from small-pox is to be avoided. *This can be achieved by re-vaccinating with the smallest single site insertion compatible with a successful take*, or if re-vaccination to the extent laid down in the Vaccination Order is now desired, it is of no serious import to the healthy child aged five years, and to avoid disfigurement in girls it is an easy matter to re-vaccinate them on the calf of the leg just below the head of the fibula, the girl remaining in bed for a few days round about the period when the vaccinia attains its full development.

It has seemed desirable to set forth in some detail this alternative vaccinal procedure, in view of the undoubted hostility of many intelligent parents to the extensive vaccination of their children at the age of six months. It need scarcely be repeated that vaccination and re-vaccination as above obtained will certainly prevent small-pox. Even although the disease, as prevalent in England at present, is of a mild description, the grave form of small-pox may appear in this country at any time, and parents would do well to hesitate before they secure the exemption of their children from vaccination and thus expose them to the danger of contracting the severe form of the disease, which may leave them with the life-long handicap of an indelibly scarred face, of blindness, or of deafness.

Scarlet Fever.

The prevalence of this disease continues to be low, 197 cases being recorded, with a case-mortality of 1·5 per cent. During the 1914-1923 decennium, which included several periods of high epidemic prevalence, the average yearly number of cases was 688 and the case-mortality 4·3.

DICK TESTING AND ACTIVE IMMUNISATION WITH SCARLATINAL STREPTOCOCCUS TOXIN.—Dick testing and active immunisation against scarlet fever is being intensively investigated by Dr. Smith, City Bacteriologist, and the detailed results of the investigation will be duly recorded elsewhere. Meantime, it may be said that as each case of scarlet fever is admitted into hospital a bacteriological examination of the secretions from the throat and nose is made. It has been found that, in 1924, 100 per cent. of the acute cases admitted harboured hæmolytic streptococci. The strains of streptococcus scarlatinæ have been further studied in regard to their hæmolytic activity, biochemical reactions, and serological classifications by the agglutination and absorption tests. Their power to produce toxin has also been studied. For this purpose the streptococci are grown in Hartley's trypsin broth or on proteose peptone broth containing 2 per cent. of sterile sheep's blood. After incubating for 24 hours, 0·4 per cent. phenol is added to the cultures, and after centrifuging, the supernatant fluid is passed through a Berkefeld filter. The filtrate so obtained is diluted with carbol saline, and various dilutions (1 in 500 to 1 in 10,000) are injected intracutaneously into a susceptible individual. An injection of diluted toxin which has been heated to 95° C. for 1 hour is also made in case the individual should also be susceptible to protein. The toxigenic qualities of various strains of streptococci have been found to vary considerably. The injection causes no discomfort whatsoever. A positive reaction develops in from 6 to 12 hours as a light red flush. The maximum reaction is obtained in 24 hours, and measures usually 30 mm. or 1 inch in diameter. All cases of scarlet fever are Dick tested, and it has been found that in the early stage of the disease practically all give a positive reaction. When again tested during convalescence the positive reaction is in most cases found to be no longer present. The Dick test would appear to be of value in the diagnosis of doubtful cases of scarlet fever, and also indicates those individuals whose blood contains little or no antitoxin and who would thus be susceptible to infection by the streptococcus scarlatinæ.

A satisfactory beginning has been made with the active immunisation of healthy persons reacting positively to the Dick test. The lack of a precise standard for the skin dose of streptococcus toxin makes it difficult to define the number of skin doses which when injected subcutaneously will provide the best immunity response. Thus, the variation in the toxigenic qualities of different strains of streptococci is such that one preparation of toxin may give 50 per cent. more positive Dick reactions than another preparation tested concurrently. So far, it may be said that with a strong preparation of toxin as judged by the high proportion of positive Dick reactions obtained with it, three immunising injections, with a week's interval between each, of 250, 1,000, and 1,500 skin doses are indicated.

SCHULTZ-CHARLTON REACTION.—In the original Schultz-Charlton diagnostic test for scarlet fever, 1 c.c. of human serum from a convalescent scarlet fever patient was injected intracutaneously at the height of the eruption into an area where the rash was well marked, and if the rash were scarlatinal a positive reaction was obtained, an anæmic zone appearing at the site of injection varying in extent from the size of a five-shilling piece to that of the palm of the hand.

In the Schültz-Charlton reaction as now performed, 0·2 c.c. of a 1 in 10 dilution of scarlatinal antistreptococcus horse serum is similarly injected intracutaneously into the brightest area of the rash, and if the test be positive an area of blanching, about one inch in diameter, appears usually in about four hours and always within twenty-four hours at the site of injection. Using the test as thus modified, the Aberdeen experience confirms experience elsewhere to the effect that a positive Schultz-Charlton reaction is obtained in 90 per cent. of cases of scarlet fever, the negative nature of the reaction in the remaining 10 per cent. of scarlet fever cases being attributed to known differences in the strains of scarlatinal streptococci.

The Schultz-Charlton reaction has been found to be of considerable value in the diagnosis of doubtful cases of scarlet fever in Aberdeen.

Specific Treatment—Scarlatinal Antistreptococcus Serum.—The newer knowledge of scarlet fever has provided a fresh prospect of curing the disease by means of scarlatinal antistreptococcus serum. Sufficient laboratory work has been done to indicate the complexity of the problems that have yet to be solved in connection with the production of toxin and antitoxin by the scarlatinal streptococci. Meantime it may be said that the use of antistreptococcus serum, prepared by O'Brien and others from horses especially immunised with strains of scarlatinal streptococci, is, on the whole, yielding encouraging results in the treatment of toxic cases of scarlet fever. The serum should be used in large doses—100 c.c. or more in twenty-four hours—and should be repeated until the condition of the patient is greatly improved.

Diphtheria.

The prevalence of this disease, which had very definitely diminished during the year 1923, showed an increase in 1924, there being 286 cases, as against 189 in 1923. The case-mortality for 1924 was 3·8 per cent. The annual average number of cases during the 1914-1923 decennium was 590, with a case-mortality of 6·4 per cent.

In order to discover possible diphtheria carriers and such cases in infected households as had not been recognised on account of the absence of clinical symptoms, swabbings from the throat and nose, for bacteriological examination, have continued to be taken from the contacts in all houses in which definite cases had been notified. In the cases thus examined, 0·4 per cent. of the swabbings gave a positive finding bacteriologically. During the 1914-1923 decennium, when the average number of diphtheria cases was much greater, the percentage of positive swabbings averaged 4·0. It is now a generally accepted conclusion that when any carrier disease gains epidemic proportions, the number of healthy carriers of the infection is correspondingly increased.

Schick Testing and Toxin-Antitoxin Prophylaxis.—During 1924, active immunisation against diphtheria of the staff of the City Hospital was continued.

Of the patients in the City Hospital, Schick testing and re-testing was carried out in 88 persons over 6 years of age. Of these, 38 gave positive reactions, 40 negative reactions, and 10 pseudo-reactions (3 of which were positive and 7 negative). Of the 41 patients giving positive results, 24 were immunised, the remainder being discharged from hospital before the administration of toxin-antitoxin was possible. Without any preliminary Schick testing, active immunisation was carried out in 91 children, suitable so far as their general health was concerned and under 6 years of age. Thus, in all, 115 patients received prophylactic injections of toxin-antitoxin, and so far none of these has been re-admitted to the wards with clinical diphtheria bacteriologically confirmed. Twenty-five per cent. of the children immunised showed slight local reactions, the arm becoming red and slightly swollen. In none was there any general disturbance,

Typhoid and Para-Typhoid Fevers.

All new members of the staff of the City Hospital received the usual anti·typhoid inoculations, and the nurses in the typhoid section were given annual re-inoculations when due.

Seven cases of typhoid fever were reported, with 1 death, as compared with an annual average of 21 cases and 3 deaths during the preceding decennium.

An interesting case, in a seaman on a steamer from a Baltic port, occurred early in the year. The patient was originally admitted to the City Hospital suffering from diarrhœa with blood in the stools, and, although no bacteriological evidence of bacillary dysentery was obtained, he appeared to respond to anti-dysenteric serum therapy, and was returned to his ship 8 days later. Eight days thereafter he was again transferred from his ship, having been sickening for a week from typhoid fever. The illness ran a moderately severe course and was confirmed bacteriologically. It was then ascertained that this patient was infected with a tape-worm—dibothriocephalus latus—a type rare in this country, but frequently found around the Baltic seaboard, and there was little doubt but that the earlier diarrhœa which had been regarded as dysenteric was really due to this parasite.

The source of infection in a female case—a woman aged 49 years—admitted to hospital in September, was definitely determined to be due to infection by a female carrier living in the same house and preparing the food. This carrier, who was 67 years of age, had suffered from enteric fever 50 years previously, and was suspected of originating a case of typhoid fever in 1914, but at that time examination of the stools and urine proved negative. In October, the carrier condition was demonstrated bacteriologically, typhoid bacilli being found in the fæces.

The fatal case, a woman aged 37 years, was admitted to hospital at the beginning of her third week of illness. From the commencement, the illness was of a grave nature, and when admitted to hospital the patient was having repeated hæmorrhages from the bowel. The source of infection was not determined. The patient and her family had been associated with a case of typhoid fever about a year previously, but the husband and the daughter (aged 4 years) were both subjected to full bacteriological examination, with negative results.

Of para-typhoid fever, there were 2 cases during the year.

Venereal Diseases.

Syphilis, caused by the spirochæta pallida, and gonorrhœa, caused by the gonococcus, are among the most constantly prevalent of all serious infectious diseases. The Royal Commission on Venereal Diseases estimated that 10 per cent. of the population are infected with syphilis, and that 20 per cent. of the population are infected with gonorrhœa. From the public health point of view, the immediate problem is the prevention of further spread of infection. From this standpoint of prevention, the early treatment of persons infected with venereal diseases is the most efficacious single method that can be applied. Patients receiving early treatment cease to be infectious in a comparatively short time, and accordingly are rendered incapable of transmitting the diseases. The infection of syphilis is acquired by direct contact with infected persons, by inoculation with infected things, and by congenital transmission; and gonorrhœa is acquired by direct contact with infected persons, by inoculation with infected things, and by infection at birth.

Venereal Prophylaxis.—Medical prophylaxis is available for the prevention of venereal infections. Thus, it has been shown that a 33 per cent. calomel ointment in lanoline, applied within six hours of sexual intercourse, is generally effective in preventing syphilitic infection. It has also been shown that a 1 per cent. solution of silver nitrate is effective in destroying the gonococcus. In the application of these medical prophylactic measures, the following procedure is necessary. Immediately following intercourse, urine is passed. The genitalia are then thoroughly washed with soap and water, using plenty of soap. Calomel ointment, 33 per cent., is well rubbed into the parts for at least ten minutes, and a solution of silver nitrate, 1 per cent., is injected into the urethra. It will be obvious that such medical prophylaxis is likely to be efficient only if performed after medical instruction. For the prevention of venereal infection, the condom, or sheath, is valuable, and is an almost certain protection against venereal infection, being more reliable than prophylactic ointments.

A detailed analysis of cases of venereal diseases which have come to the knowledge of the Health Department is given in the section of this report dealing with the Venereal Diseases Services. During the year, there were 147 fresh cases of syphilis, 262 of gonorrhœa, 1 of soft chancre, and 21 of mixed infections.

Ophthalmia Neonatorum.

In terms of the Public Health (Ophthalmia Neonatorum) Regulations (Scotland), 1918, the expression "Ophthalmia Neonatorum" includes any inflammation that occurs in the eyes of an infant within twenty-one days from the date of its birth, and is accompanied by a discharge. Gonorrhœal infection in the mother frequently causes severe conjunctivitis in the child within a few days of birth, and the gonococcus is responsible for the majority of the graver cases of ophthalmia neonatorum. Ophthalmia neonatorum can certainly be prevented by proper care of the expectant mother and new-born child. In connection with the prevention of ophthalmia neonatorum, the following printed directions are issued to all midwives within the City:—

City of Aberdeen—Health Department.

OPHTHALMIA NEONATORUM.

(Infectious Inflammation of Eyes in New-Born.)

DIRECTIONS TO MIDWIVES.

NOTIFICATION TO MEDICAL OFFICER OF HEALTH.

This disease is the commonest cause of blindness in infants. It is compulsorily notifiable; and every case of inflammation of the eyes of an infant, however slight, if accompanied by a discharge, must be notified forthwith to the Medical Officer of Health by the Midwife.

The infection is usually obtained from the mother's passages in the course of birth. The infection is preventible, and can be prevented or checked by the Midwife carrying out the following precautions as soon as possible after the birth of the child.

PRECAUTIONS AT BIRTH.

1.—*Vaginal Douche.*—If the mother is known to be suffering from a purulent vaginal discharge before birth—and careful inquiry as to the presence of such a discharge should have been made before the confinement begins—douche the vagina thoroughly before the birth with a *warm* disinfectant solution, such as mercury perchloride (1 in 2,500), lysol ($\frac{1}{2}$-oz., or one tablespoonful, in 2 pints of water), or cyllin or izal ($\frac{1}{8}$-oz., or one teaspoonful, in 2 pints of water).* [*See also paragraph on "Treatment of Mother."*]

* An ordinary so-called quart bottle holds $1\frac{1}{3}$ pints, so that one-and-a-half quart bottlefuls equal 2 pints.

2.—*Wiping of Infant's Eyes.*—Whether such discharge in the mother existed or not, never omit to wipe carefully the eyelids of the child *immediately* after birth with pledgets of clean absorbent wool, using fresh pledgets for each eye; and burn the pledgets.

3.—*Bath.*—The first bath or washing of the child should be carried out tenderly, but with thoroughness, so that all possible infectious matter from contact with the mother's passages may be removed. It is sufficient to use warm water and soap, without the addition of a disinfectant.

(*a*) First wash the head, face, eyelids, and neck, and dry with a clean soft towel.

(*b*) Next wash the body, paying attention to the cleaning of baby's fingers, so as to remove all infectious matter.

(*c*) Finally, the Midwife should wash her own hands with soap and fresh water, using nail brush.

4.—*Application of Silver Nitrate to Eyes.*—Immediately after dressing the child, drop on the surface of each eye at its outer angle, the eyelids being kept gently open, 1 drop of one per cent. solution of silver nitrate to destroy any possible infection within the eyelids. This is an almost certain preventive of ophthalmia, and should never be omitted from the first toilet of every newly-born child whether the mother has a vaginal discharge or not. The silver nitrate solution should be applied once only, and should not be re-applied except under medical direction.

FURTHER CARE.

1.—*Daily Observation of the Eyes.*—Do not fail, on making the daily visit during the lying-in period, to examine the eyes for the appearance of inflammation, so as to commence treatment at once if required. If, in spite of precautions, infection has taken place, inflammation may begin to be noticed as early as the first day, but more often about the third day. The inflammation may appear still later from infection from the mother after birth.

2.—*Medical Assistance.*—On observing any inflammation, however slight, the Midwife must at once call in a Medical Practitioner, or see that child is taken without delay to the Eye Clinic at the Royal Infirmary or the Eye Institution. At the same time she must notify the case to the Medical Officer of Health.

TREATMENT.

1.—*Treatment* by a Specialist in Eye Diseases will in most cases be found to be expedient, and may be obtained by taking the baby to the Out-patient

Eye Clinic of the Royal Infirmary or the Eye Institution. The hours of the Eye Clinics in Aberdeen are at present as follows :—

(*a*) Royal Infirmary, . . .	daily at 10 a.m.
(*b*) Eye Institution, . . .	do. 10 a.m.

The Clinic nearest to the patient's home should be chosen. If the mother finds difficulty in getting a friend or neighbour to carry the infant to the Clinic, assistance will be given on application to the Health Department.

In-patient treatment is provided at the following institutions:—

Child only—(*a*) City Hospital for Infectious Diseases.
(*b*) Aberdeen Maternity Hospital.
Mother and Child—(*a*) City Hospital for Infectious Diseases.
(*b*) Royal Infirmary—Skin Department.

2.—*Home Treatment.*—The Eye Specialist will usually give directions as to the treatment at home, in addition to the treatment at the Clinic, and state how frequently the child is to be brought to the Clinic.

3.—*Attention to Instructions.*—The home treatment, whether prescribed by the family Medical Attendant or by the Clinic Specialist, must be rigidly carried out. Assistance will be given, if required, by the Health Visitor or Nurse from the Health Department, who will call after the notification of the case has been received by the Medical Officer of Health.

4.—The visits to the Eye Clinic and the treatment at home must be continued so long as required by the Clinic Specialist.

Result of Neglect of Proper Treatment of Infant.

The consequence of the neglect of prompt and proper treatment, carried out to due completion, may be permanent blindness, one of the greatest calamities that can befall a child.

Each of us must see that no part of the blame for such a result rests with us.

Treatment of Mother.

Ophthalmia in its severer forms is usually due to gonorrhœal infection from the mother, and it is desirable that the mother should herself undergo suitable treatment. But the suggestion of the existence of gonorrhœa in the mother must not be made by a Midwife, or Nurse, or Health Visitor. This should be left entirely to the Eye Specialist or to the private Medical Attendant. Under the Regulations for Midwives, it is, however, the duty of a Midwife in charge of a woman who is about to be confined, or has been confined, and who shows signs of a purulent vaginal discharge, to call in a Medical Practitioner, or advise the patient to see a Medical Practitioner, with a view to the diagnosis and treatment of the condition. If the discharge is gonorrhœal, the patient can be treated at the Skin Clinic of the Royal Infirmary. It may, however, be thought inexpedient by the Medical Attendant to give such advice as will disclose the venereal nature of the illness. In such cases, if the Doctor himself cannot undertake the treatment, the case may be treated at the City Hospital by previous arrangement with the Resident Medical Officer.

Personal Precautions by Midwife.

In order to prevent infecting herself or any of her other patients, the Midwife, after dealing with a case of infectious vaginal discharge or of ophthalmia neonatorum, should thoroughly wash her hands and nails with soap and water, using a nail brush. She should also, by wearing an apron while handling the case, endeavour to avoid soiling her ordinary clothing with the discharge.

SUPPLY OF DISINFECTANTS.

Midwives may obtain, without charge, a supply of disinfectant, as also of nitrate of silver solution, on personal application to the Health Department, 41½, Union Street.

The loan of a douching apparatus may also, in certain cases, be obtained.

Ophthalmia neonatorum was responsible for 69 cases during 1924, as compared with an average annual number of 63 during the preceding ten years.

DISEASES SPREAD BY DISCHARGES FROM THE MOUTH AND NOSE.

It is possible to prevent the transmission of such diseases as typhoid fever, dysentery, and cholera, in which the infection is confined to the excreta, by adequate control of these discharges, but no practical means have been devised to control adequately spray infection and so prevent the transmission of such diseases as influenza, pneumonia, respiratory tuberculosis, whooping-cough, measles, scarlet fever, diphtheria, epidemic meningitis, poliomyelitis, and epidemic encephalitis, whose infection is confined to droplets of infected saliva and mucus expelled from the mouth and nose in talking and coughing and other expiratory efforts.

It has been shown by experiment that a gauze face mask composed of three layers of gauze with a mesh of forty threads to the inch is sufficient to filter out the common pathogenic bacteria, but the Aberdeen experience indicates that the discomfort in wearing the face mask is such that nurses will not take advantage of this protection unless under constant surveillance. Moreover, the gauze of the mask when in use rapidly becomes moist and warm, and so affects the inspired air that it fails to stimulate the mucous membrane of the upper respiratory passages in the manner that fresh air does, with the result that there is a tendency for the mucous membranes to become less resistant to infection.

It would appear, therefore, that the prevention of spray infections has to depend on the provision of specific immunising agencies. Such specific prophylactics have been devised for the control of such spray infections as scarlet fever and diphtheria.

Measles and Whooping-cough.

Measles and whooping-cough ceased to be compulsorily notifiable in Aberdeen in 1903, but a large proportion of the cases is brought to the knowledge of the Health Department by the visits of the attendance officers of the Education Authority to the homes of the children who are absent from school. The following up of such cases by the infectious disease inspectors of the Health Department brings to light many cases in children of pre-school age in the families visited. In addition, the regular visits of the Health Visitors to mothers and children lead to the discovery of other cases and add considerably to our knowledge of the prevalence of measles and whooping-cough.

The number of cases of measles coming to the knowledge of the Health Department in 1924 was 1,488, the average yearly number of cases during the 1914-1923 decennium being 1,029. The seasonal increase normally expected in April, May, and June was exaggerated to epidemic proportions, there being 519 cases discovered in May. In the summer and autumn, the number of cases was negligible, but by December the disease was again beginning to assume epidemic prevalence—130 known cases having occurred, as against 56 in November. The case-mortality of measles was 3·8 per cent., as against an average of 5·1 per cent. for the preceding ten years. The deaths during 1924 were wholly confined to children under five years of age.

The number of cases of whooping-cough coming to the knowledge of the Health Department was 1,712, with 71 deaths, giving a case-mortality of 4·1 per cent. The disease had begun to assume epidemic prevalence in August, attaining its greatest height in November, when 333 cases were brought to the notice of the Health Department. In December, the number of cases had declined to 254, but in this month there were 25 deaths, as compared with 12 deaths in November. In the early months of the present year, the disease still maintains epidemic proportions, and the extent of the most recent epidemic of whooping-cough cannot yet be measured. The average annual number of cases during the 1914-1923 decennium was 610, the percentage of deaths being 6·2.

Formerly, provision made for home nursing services and for hospital maintenance of cases of measles and whooping-cough in children under five years of age ranked for grant under the Maternity Service and Child Welfare Scheme, but, as a result of the need for restriction of public expenditure, the grant for this purpose was discontinued on 1st May, 1922. On account of the epidemic prevalence of measles in the west of Scotland towards the end of 1923, the Board of Health convened a meeting of Local Authorities in Edinburgh on 10th January, 1924, for the purpose of ascertaining the views of Local Authorities as to what additional administrative action would best secure greater efficiency in the control and treatment of measles and whooping-cough in epidemic times. On 16th October, 1924, the Board made available a special grant to be expended in augmenting measures for the control of measles and whooping-cough, and to this end agreed to pay grant on the cost of notification of first cases of these diseases, on the provision of additional health visitors, and on hospital maintenance charges for children under five years of age suffering from measles and whooping-cough.

Measles is practically never absent from the City. The annual reports of the Medical Officer of Health giving the monthly incidence of the main infectious diseases show that during the past twenty years of modified notification Aberdeen has not been free from measles for any year, and has only been apparently free from the disease for at most one month in an exceptional year. Further, if the figures relating to the compulsory notification of measles during the twenty years 1882 to 1903 are surveyed, it will also be seen that cases of measles were never absent from the City during any of the yearly periods. It is interesting to note that during the whole forty years of compulsory and modified notification of measles, the disease obeyed the epidemic law and appeared in epidemic form only at triennial intervals, although children susceptible to measles were always abundantly available. So also whooping-cough has obeyed the epidemic law and has shown a biennial epidemicity during the past forty years.

NOTIFICATION OF MEASLES AND WHOOPING-COUGH.—With reference to the notification of measles and whooping-cough, the Aberdeen statistics provide a unique test of the value of compulsory notification, since the diseases were compulsorily notifiable from 1881 to 1902—being first made compulsorily notifiable under a local Act in 1881, and later under Section 7 of the Infectious Disease Notification Act of 1889, so that the purpose of dual notification by the parent and doctor could be secured.

During these twenty years, 1881 to 1902, an intensive effort was made to control measles and whooping-cough by means of hospital isolation and the provision of nursing services to cases throughout the City, so as to secure as early as possible isolation in hospital or at home. These measures had no effect on the statistical form of the disease. In these former days the older view was held by sanitarians that the purpose of a fever hospital was primarily for isolation and secondarily for nursing—an idea that has now gone by the board. Increasing information with reference to the common zymotics has convinced every one that the value of the fever hospitals of the country lies mainly in the provision of nursing services, and that hospital isolation has no appreciable effect in controlling epidemics of measles and whooping-cough. Edinburgh had compulsory notification of measles under the Edinburgh Notification Act for practically the same twenty years, and Sir Henry Littlejohn, the then Medical Officer of Health, in reporting on compulsory notification, stated that when he had originally advocated and secured compulsory notification of measles, he looked forward to being able, as a knowledge of its life history increased, to exercise a control over its spread, but added that, unfortunately, he had to acknowledge that his hopes had been falsified. At the same time he said he had to admit that his personal feeling was in favour of the retention of the notification of measles on the ground that the more a sanitary authority knew of the existence of a disease in a district the better. On the other hand, measles has never been compulsorily notifiable in Glasgow, Dundee, or Leith, although in Leith there was at one time introduced a system of voluntary notification by the medical men of "first" cases in a family, similar to the system which the Board of Health are now prepared to recognise as ranking for grant. It is interesting to note that the English Ministry of Health, in an effort to control the morbidity and mortality from measles, made this disease compulsorily notifiable throughout England and Wales in 1915, and the failure of this compulsory notification to prevent the morbidity or mortality of the disease was so obvious that the Ministry decided in 1919 to discontinue its notification.

It can be said, therefore, that no administrative or clinical measures have yet been devised which are capable of controlling the regular epidemic prevalence of measles or whooping-cough in any of the large cities in Britain. In view of this past experience, it did not seem that it would serve any useful purpose to recommend that the Town Council of Aberdeen should make payment for the notification of first cases of measles and whooping-cough in households. As has been stated above, there is an arrangement by which school attendance officers and health visitors report all cases of these diseases which are brought to their attention, and by following up these cases it is estimated that the Health Department gets knowledge of about two-thirds of all the measles and whooping-cough cases occurring in the City.

INCREASED NURSING FACILITIES.—Increased hospital facilities are urgently required in Aberdeen for the treatment of cases of measles and whooping-cough. The beds previously available for cases of these diseases have been greatly diminished by the admission to the City Hospital of cases of tuberculosis and marasmus, and, accordingly, in epidemic times hospital accommodation for cases of measles and whooping-cough living under home conditions impossible to the ordinary chance of recovery can only be obtained by excluding cases of other infectious diseases.

As regards home nursing services, it has been found that the services of trained fever nurses working directly from the Hospital and affording nursing instruction and treatment in the homes of patients suffering from measles and whooping-cough best meet the requirements. In Aberdeen the Board of Health have sanctioned this arrangement in lieu of the appointment of additional health visitors.

PREVENTION OF MEASLES.—In an area like Aberdeen, where measles is endemic, there is rarely found in a gathering of adults who have been born and bred in the City a single individual who has escaped infection. Adult persons suffering from measles are to be found in the City Hospital, but they are people who have immigrated to the town after having been bred in the secluded highlands and islands where for generations the disease may have been unknown.

The method by which temporary immunity to measles is induced by the injection of the blood serum of measles convalescents cannot be utilised as a prophylactic measure for the general prevention of measles in the community, and accordingly, from a public health point of view, the prevention of measles is at present largely limited to the prevention of deaths from the disease. Measles is most fatal in the early years of life—60 per cent. of all the deaths occurring during the first two years. After five years of age the death-rate is almost negligible. It is essential, therefore, that every effort should be made to guard a child from exposure to infection until the dangerous age is past. It is true that a child so guarded can hardly escape the disease on going to school, but by that time the danger of the disease is greatly diminished.

When measles occurs in a family where there are young children, special efforts should be made to save the youngest children from infection. It is here that the special prophylactic measure, by which children who have been exposed to the infection of measles can be prevented developing the disease by the injection of convalescent serum, is of great value. The serum for the purpose is obtained from measles convalescents between the sixth and tenth days after the temperature has become normal. Since an occasional convalescent donor may be a poor anti-body producer, it is advisable that at least three different sera should be pooled together. Such convalescent serum when kept in the ice-chest retains its prophylactic property for at least two years. At least 10 c.c. of the convalescent serum should be injected intramuscularly as early as possible, and within ten days of the child being exposed to infection. The protection afforded by the injection of convalescent serum probably lasts only for a few weeks. The value of this prophylactic procedure is accordingly limited and in practice is confined to the protection of young children who have been in contact with the disease.

The greatly preponderating mass of measles infection is brought to the home by the child at school, and an effort should be made to save the younger children from infection by isolating them at home. The success of such isolation will depend mainly on the early recognition of measles in the older children. The appearance of Koplik's spots on the buccal mucous membrane before the rash comes out on the body is indicative of measles, but it is to be noted that if a case of measles is only first diagnosed on the appearance of Koplik's spots, then the diagnosis is made too late to prevent further infection, the patient being already infective. The appearance of the conjunctiva of the lower eye-lids prior to the development of Koplik's spots in the mouth gives more hope of preventing the spread of infection. At the first onset of measles the conjunctiva of the lower eye-lids appears slightly congested, with slight swelling round each tiny blood-vessel. In some cases it is possible, by noting this early conjunctival sign, to isolate developing cases of measles at a time when they are not yet infectious.

German Measles.

This disease appeared in epidemic form in the later months of the year. In all, 111 cases were brought to the knowledge of the Health Department, as against 2 in 1923, and an average of 53 during the 1914-1923 decennium. There were no deaths.

Influenza.

The cause of influenza is still a matter of controversy. The bacillus pneumosintes has recently been isolated from cases of the disease and appears as a rival to Pfeiffer's bacillus.

Influenza is not a compulsorily notifiable disease, apart from influenzal pneumonia. Influenza (apart from influenzal pneumonia) was registered as the cause of 25 deaths during 1924. At the beginning of October the disease had assumed epidemic prevalence, which continued throughout the remainder of the year. During the epidemic period, 9 deaths were certified as due to influenza, 22 as due to influenza with pneumonia, and 1 as due to influenza with bronchitis—a total of 32 deaths. In respect of age, the 32 deaths were distributed as follows:—Under 5 years, 4; 15-25, 3; 25-45, 7; 45-65, 5; and above 65 years, 13. The number of deaths was the same for both sexes. The epidemic was of considerable magnitude, but not of a very grave description as measured by the increase in deaths from influenza and its complications. The large majority of the patients, however, were sharply ill, and in some cases severely ill.

A pneumosintes vaccine has been placed upon the market. The R.A.M.C. vaccine (containing, per c.c., Pfeiffer's bacillus, 400,000,000; pneumococci, 200,000,000; and streptococci, 60,000,000) is on issue from the Health Department, and is worthy of further trial during the epidemic prevalence of influenza, with a view to diminishing deaths from the grave complications of the disease.

Acute Primary and Influenzal Pneumonia.

There were 383 cases of primary pneumonia notified, with 121 deaths. Primary broncho-pneumonia still continues to be incompletely notified, a regrettable circumstance in view of the hospital provision that is now being made for the graver cases of this infection. Of influenzal pneumonia, there were 77 cases, with 29 deaths.

Serum Treatment of Pneumonia.—Bacteriological investigation has resulted in the grouping of pneumococci into four groups or types on the basis of agglutinative and protective tests. By means of sputum examination the type of pneumococcus in any given infection can be rapidly determined, with the result that the question of the advisability of using serum therapy can be settled early in the illness. In only 22 cases of pneumonia out of the 383 cases notified was the sputum submitted for bacteriological examination with a view to determining the type of infecting pneumococcus. Of these 22 cases in which the sputum was typed, 14, or 64 per cent., were found to be Type I. infections.

A serum for the treatment of Type I. pneumonias has been put on the market, and should be given intravenously in 50 c.c. doses every twelve hours until the resolution of the illness. It is unwise to be dogmatic in assessing the value of a particular remedy in a disease like pneumonia, with its variable duration, but the Aberdeen experience would indicate that in Type I. pneumonias without bacteræmia the results produced by anti-pneumococcic serum are frequently dramatic, the patient very often having his crisis and proceeding towards recovery within twenty-four hours of serum administration. In the much graver Type I. pneumonias with bacteræmia the need for intensified serum treatment is the more urgent. The earlier the serum is given the better, but the serum is indicated regardless of the day of illness.

The smallness of the number of Type I. pneumonias for which serum therapy was made available during the year is dependent on the fact that no general use has yet been made of the laboratory facilities that are provided for determining the type of pneumococcic infections. Anti-pneumococcic serum for the treatment of Type I. pneumonias can be obtained on request at the City Hospital.

Meningococcic Meningitis.

There were 4 cases of this disease, with 3 deaths. There was no discoverable relationship between any of these cases. During the preceding ten years, the average annual number of cases was 5·9, and the average annual number of deaths 4·2.

Contacts within the houses in which cases of cerebro-spinal meningitis occurred were examined bacteriologically, with negative results. Atypical meningococci continue to be the predominating type of infecting organisms, and this absence of the epidemic strains probably accounts for the disappointing results at present being obtained from the intrathecal administration of anti-meningococcic serum.

Acute Poliomyelitis.

Six cases of this disease were notified to the Health Department. There was no association between any of the cases, nor was the source of infection determined in any case. In all the cases the paralysis was monoplegic. Early cases are admitted to the City Hospital, and out-patient treatment is provided at the Sick Children's Hospital and the Royal Infirmary.

Epidemic Encephalitis.

Of this disease, 7 cases were reported, with 3 deaths. The epidemic increase of this disease in England and Wales in 1924, when there were 5,000 cases notified, has only been reflected to a very faint degree in Scotland. The most distinctive difference in the type of the disease in the 1924 epidemic, as compared with the disease when prevalent in 1918-1921, has been the great increase in mild cases. In this form of the disease the most prominent symptom, occasionally the only symptom, has been nocturnal excitement, the next most frequent symptom being varying lethargy, and the third, and less frequently, diplopia. The four Aberdeen cases which recovered were of this mild type. In them neither the cellular nor sugar content of the cerebro-spinal fluid was increased to any significant extent. In the three cases that were reported as deaths from epidemic encephalitis and registered as such, the fullest inquiry into all the circumstances of the illnesses and the findings at the autopsies in two of the cases make it evident that these three deaths should not be accepted as deaths from epidemic encephalitis. The lack of any evidence in any of the three cases which would confirm the diagnosis justifies this conclusion. Traumatic meningitis would be a vague, but, in all the circumstances, a more consistent diagnosis.

It is interesting to recall that the first case of undoubted epidemic encephalitis brought to the knowledge of the Aberdeen Health Department was admitted to the City Hospital on 24th May, 1918. The patient, a well-educated girl aged 17 years, had on admission typical lethargy without localised paralyses, and even when roused by strong stimuli appeared quite unintelligent. That this apparent stupidity was due mainly to lack of power of expression and not to lack of comprehension was only appreciated after the patient's recovery, when she gave a detailed narrative of all the means that had been employed to stimulate her in her stuperose condition. Following on the completely stuperose condition, the patient presented a typical Parkinsonian facies, from which she completely recovered in six weeks' time. The completeness of the recovery to date may be judged by the fact that the patient proceeded with more than average ability to qualify as a certificated school teacher, and has been fully engaged in the practice of her profession for the past four years.

Although the cause of epidemic encephalitis is obscure, there is good reason to believe that, as in other acute infective fevers whose viruses have a selective action on the central nervous system, the infection is contained in the naso-pharyngeal secretions, and is spread by spray infection and enters the body by the naso-pharyngeal route.

Tuberculosis.

From the practical point of view, there are two sources of tuberculosis in man. The principal source is human sputum and spray infection from patients suffering from respiratory tuberculosis, and the lesser source is infected milk from tuberculous cows.

The tubercle bacilli that affect man are of two types, which are named, after the hosts in which they commonly occur, the human and the bovine types. Many investigations have shown that only about 1 per cent. of cases of pulmonary and generalised tuberculosis in man are due to the bovine type of the bacillus, whereas in some 66 per cent. of tuberculosis of the glands, in 50 per cent. of abdominal tuberculosis, in 50 per cent. of tuberculosis of the skin, in 25 per cent. of tuberculosis of the bones and joints, in 20 per cent. of tuberculosis of the meninges, and in 18 per cent. of genito-urinary tuberculosis the infection is of the bovine type. Applying these proportions to the various forms of tuberculosis notified in Aberdeen, it is found that of the 419 cases notified in 1924, 363, or 87 per cent., were infections with the human type of tubercle bacilli, and that 56, or 13 per cent., were infections with bovine type bacilli. Similarly, of 213 deaths in Aberdeen from all forms of tuberculosis in 1924, it is estimated that 195, or 91 per cent., of these deaths were due to tubercle bacilli of the human type, and that 18, or 9 per cent., were due to bovine type bacilli.

It is impossible to assess with any degree of accuracy the prevalence of tuberculosis in the community apart from the registered deaths. Figures relating to the notification of tuberculosis are notoriously unreliable as a measure of the incidence of the disease, but the following figures are meantime submitted without correction or detailed analysis. During the years 1911 to 1924 inclusive, there has been notified in Aberdeen a total of 8,536 cases of all forms of tuberculosis, and of these, 3,472 have died and 5,064 have, so far as is known, survived. Of these cases assumed to be surviving, many are cured and several untraced. On the other hand, many mild and early cases are never notified. With 5,064 cases of notified tuberculosis presumably surviving at the end of 1924, and with 213 registered deaths from tuberculosis in 1924, the proportion of deaths to known cases is 1 to 24, which proportion is in excess of the high estimate of 1 to 20 given by Sir Robert Philip before notification data were available.

A detailed analysis of the cases and deaths from tuberculosis in Aberdeen is given in the section of this report relating to the Tuberculosis Services.

Chicken-pox.

There is reason to believe that the infection of chicken-pox is contained in the throat and in the crusts of the rash. The infection from the skin can be largely controlled by daily bathing and the application of an emollient dressing, whereas methods for the control of spray infections from the throat have yet to be devised. At any rate, such views as to the sites of infection in cases of chicken-pox serve to explain some of the anomalies that characterise the spread of chicken-pox. The disease is accordingly included in the group of diseases spread by discharges from the mouth and nose.

Chicken-pox was not compulsorily notifiable during 1924, but during the year 318 cases were brought to the knowledge of the Health Department. There were no deaths.

DISEASES SPREAD BY THE EXCRETA.

Typhoid and Para-Typhoid Fevers.

These diseases, which are the classical examples of diseases spread by the excreta, have already been considered under the group of diseases for which there is a specific prevention.

Criticism of Current Views on Causes of Decline of Enteric Fever.—The decline of enteric fever in Scotland during the past 50 years provides a fascinating study for the epidemiologist. Dr. A. K. Chalmers, Medical Officer of Health of Glasgow, has recently directed attention to the two main periods of this decline—the earlier decline from 1875 onwards, until 1886-1899, during which years the rate of descent was interrupted for males, and again the continuous and uninterrupted descent since the beginning of the present century.

It has been suggested that the 1875 decline in Scotland was due to improvement in water supplies and that the 1900 decline was due to the effect of improved domestic sanitation secured by the increasing application of the sanitary provisions contained in the Burgh Police Acts. In England and Germany the decline in enteric fever also occurred about 1875, and has been attributed mainly to improvement in water supplies. At that time, typhoid fever was a disease of crowded communities, occurring with greater frequency in cities than in the country. It is generally agreed that the earlier diminution in the disease had a direct relation to the purification of water supplies, and that the diminution in enteric, which manifested itself first in cities and only later in rural areas, is explained by the fact that the water supplies of large cities were the first to be safeguarded. So also the American statistics give further support to the view that the prevention of water contamination was a main factor in the decline of enteric fever. In America, the decline was twenty years later in occurring than in Europe, and even as recently as 1910 enteric mortality in American cities exceeded that of European cities by more than three times. So also, the decline in the incidence of enteric fever in America during the past thirty years was associated with improvement in water supplies, and first manifested itself in crowded communities, where originally it was most severe, whereas enteric fever is now a disease of rural communities.

Sir George Newman, Chief Medical Officer of the Ministry of Health, in his Annual Report for 1923, reviews the decline of enteric fever in England,

and points out that improved water supply was a large factor in the regular diminution of enteric fever prior to 1900, and has a share also in the more recent decline; and he refers to an epidemic in 1921 in which there were 397 cases and 45 deaths due to an inadequately guarded water supply. He states that wherever such conditions still exist access of the bacillus to the water and its multiplication in the water may cause a similar calamity. In commenting on Newman's report, the *British Medical Journal* of August 30, 1924, in a leader on the Conquest of Enteric Fever, reiterates Newman's view that the bacillus typhosus can multiply in water. Sufficient work, however, has been done within the Public Health Department of Aberdeen University, on the viability of typhoid bacilli, as recently as 1923, to show that there is no evidence whatsoever that under conditions existing in nature typhoid bacilli can possibly multiply in water.

In spite of the views above quoted, that typhoid bacilli multiply in water, most modern public health workers, quite apart from the Aberdeen experiments, have been dissatisfied with the evidence that typhoid bacilli multiply in water, and accordingly have had difficulty in understanding how isolated, occasional, and sometimes single contaminations of water with typhoid excreta could give rise to epidemics of typhoid fever. The known facts make it altogether difficult and almost impossible to believe that the contamination of, say, a reservoir of water with a single typhoid stool should cause an epidemic of water-borne enteric. It is not contended that water-borne enteric did not commonly occur in the early days before there was any safeguarding of water supplies; on the contrary, the analogy of water-borne cholera makes it obvious that water-borne epidemics of typhoid fever could occur, but the view is taken that the contamination of water with typhoid infection must be continually recurrent, as is the contamination of Indian well water with cholera infection.

Among the more recent epidemics of typhoid fever that have been attributed to pollution of the water supply, there is the epidemic of typhoid fever in Aberdeen in 1912, with about 100 cases in a population of 163,000. Subsequent investigation of this Aberdeen epidemic has ensued as a result of information obtained in connection with subsequent outbreaks of enteric fever in the County, and it has now become practically certain that the supposed water epidemic was really due to milk infected by a carrier. So also the most recent epidemic of typhoid fever in Aberdeen in 1918, in which there was a total of 97 cases, has been fully proved to be due to milk-contamination, the infection having gained entrance to the milk from an unrecognised case of typhoid fever that had occurred in the household of the farmer supplying the milk.

Having these points in mind regarding the more recent and exact history of epidemic typhoid fever in Aberdeen, it is desirable to return now to the contention that domestic sanitation was responsible for the decline of typhoid fever from 1900 onwards. This view assumes that the effect of sanitary improvements in the house and its surroundings, such as the diminution of surface contamination and wet privy contamination caused the decline in typhoid fever rather than a diminution of the direct contamination of milk or other food by enteric carriers. It is difficult, in view of the evidence made available in recent years in investigating the incidence of typhoid fever outbreaks in the County of Aberdeen, to assent to this contention. In the *Journal of Hygiene* of August, 1924, an important paper on the Outbreaks of Typhoid Fever occurring in the County of Aberdeen during the past thirty years is contributed by Dr. Watt, until recently the County Medical Officer for Aberdeenshire. Therein it is shown that some 70 outbreaks of typhoid fever in the County have been wholly originated by typhoid carriers, and in practically every instance the vehicle of the transmission of infection has been proved to be milk, or there is the greatest probability that the infection was milk-borne. It will be recollected that one of the characteristics of milk-borne infections in general is the tendency for a greater incidence of the disease to appear in women and children; and the continued decline of enteric fever incidence in women and children referred to as being due to improvement in domestic sanitation and the prevention of surface contamination and wet privy contamination might better be explained by attributing it to a decline in the number of carriers, thus preventing in great part the transmission of the disease by means of milk.

It would appear to be altogether probable that for some reason, independent of improvement in water supplies and in general sanitation, typhoid fever has ceased to have the characteristics that are associated with its epidemic prevalence, and, in consequence of the absence of the epidemic form of the disease, there has been a decline in the number of enteric carriers, altogether in excess of the decline in carriers that a diminished number of cases would imply. Such a specific decline in the number of carriers is commonly experienced in other carrier diseases in the absence of epidemic conditions.

The contention that hospital isolation has diminished the incidence of enteric fever to any considerable extent is open to question. There is no evidence that any other infectious disease for which isolation on a wide scale has been provided has been limited and reduced to negligible proportions by hospital isolation. Not only so, but enteric fever is essentially a carrier infection, and hospital treatment has not provided a cure for carriers. Sir George Newman, in his Annual Report for 1923, sets out what he regards as the five principal causes of diminution of prevalence in the following order, viz.:—(1) Improved water supply, (2) prompt removal of fæcal matter and house refuse, (3) hospital isolation and treatment, (4) advance in public education in personal and domestic hygiene, and (5) purity of food. It is to be assumed that Newman does not suggest that a diminished infectiousness of food, including milk, although set last in the list, is necessarily the least cause in the decline of enteric fever.

The Aberdeen and Aberdeenshire experience during the past thirty years would suggest that typhoid fever is now almost entirely a food-borne disease due to the infection of milk or other food by typhoid carriers, and that diminution in the number of typhoid carriers, due to the absence of the epidemic form of the disease, explains the diminishing amount of milk infection.

Dysentery.

One case of amœbic dysentery was reported during 1924. The disease was contracted abroad, and the notification was dependent on a relapse of the disease on the patient coming to Aberdeen.

There were no cases of bacillary dysentery confirmed bacteriologically during the year.

DISEASES SPREAD BY CUTANEOUS INOCULATION.

Erysipelas.

This disease is due to the introduction into the skin and subcutaneous tissues of the Streptococcus erysipelatis. Other pyogenic organisms may produce inflammations resembling erysipelas. The disease showed a decrease during the year, 92 cases having been reported, as against 110 during the preceding year and an average of 164 during the 1914-1923 decennium. There were 4 deaths, as compared with a yearly average of 6·7 during the preceding ten years.

The more serious cases of erysipelas, occurring in poorer households in which proper attention cannot be obtained, were, as in previous years, removed to the City Hospital for treatment.

Scabies.

A record of the number of cases of other inflammatory affections of the skin, including scabies, receiving treatment at the Skin Department of the City Hospital is given in the section of this report dealing with City Hospital Services.

DISEASES ASSOCIATED WITH CHILD-BIRTH.

Puerperal Fever.

The vast majority of cases of puerperal fever are due to infection with hæmolytic streptococci, and the point has not yet been settled whether hæmolytic streptococci pre-existent in the maternal passages are the chief source of infection or whether the hæmolytic streptococci are in the main introduced during manipulative procedure by the accoucheur. In the preceding annual report, there is set out in detail the evidence obtained in the investigation of puerperal sepsis in Aberdeen as placed before the Departmental Committee on Puerperal Morbidity and Mortality, and the more this evidence is analysed the more does it become apparent that puerperal sepsis is essentially a clinically bacteriological matter rather than a matter of environmental conditions or of manipulative procedure.

Failure to Utilise Bacteriological Services.—It appears to be of the utmost importance, therefore, that routine bacteriological examination of expectant mothers about the seventh month should be carried out, with a view to determining what proportion of them have streptococci in the urethra or cervix. The bacteriological examination of urethral and cervical smears for the presence of gonococci, and the examination of the blood for the Wassermann reaction, are routine procedures in the examination of expectant mothers at any modern ante-natal clinic, and the extension of this work to include examination for the presence and differentiation of streptococci is clearly indicated. The continued failure to provide bacteriological services for expectant mothers in Aberdeen can no longer be regarded with equanimity.

During 1924, there were 15 cases of puerperal fever, with 8 deaths; the average annual numbers of cases and deaths during the preceding quinquennium being 13 and 7 respectively.

In order to assist in the discovery of all possible cases of puerperal sepsis, all deaths of women occurring within four weeks after child-birth have, for many years, under arrangements with the local registrars, been immediately notified to the Health Department. In 1924, maternal deaths were 5·5 per 1,000 births, corrected for transfers, and, of these, the deaths from sepsis were 1·7 per 1,000 births. In the 1919-1923 quinquennium, the yearly average of maternal deaths was 7·2 per 1,000 births, the deaths from sepsis averaging 1·6 per 1,000 births.

In all cases of puerperal sepsis, the usual precautions regarding the disinfection of the utensils and clothing of the attendant midwife or nurse were taken.

Ophthalmia Neonatorum.

Ophthalmia neonatorum has already been referred to under the section of the report dealing with diseases for which a specific prophylaxis is available.

INSECT-BORNE DISEASES.

The manner in which certain diseases, which are now known to be insect-borne, are spread was a continual source of wonder to investigators, until it was shown that the infection is conveyed by insects. In former days, the contagium of typhus fever was believed to be contained in the breath of the patient, but opposed to this was the observation that the disease was commonly nursed with impunity in the houses of the well-to-do. In 1905, during the typhus fever epidemic in Aberdeen, Professor Matthew Hay published evidence strongly implicating vermin in the transmission of the disease. Every case in hospital was found to exhibit flea bites; every case had been at the probable time of infection in the company of verminous persons, and the disease did not spread where vermin were absent; and no nurse or ward-maid, however intimate her contact with the disease, was infected unless she had assisted in removing cases to hospital or in cleansing them when they arrived. Finally, in 1909, Nicolle traced the infection of typhus to lice, and demonstrated its transmission from person to monkey, and from monkey to monkey, by means of this parasite. Once transmission of the disease by the body louse was demonstrated, it was easy to understand why typhus appears in epidemic form only in places where overcrowding, filth, and poverty, and all the conditions that poverty implies, prevail. So also great epidemics of typhus fever have occurred repeatedly in the highlands of Mexico, where lice are always found in the verminous population. The coast line of Mexico has remained free from typhus, and at the sea littoral lice are unknown.

It has now been abundantly proved that lice are responsible for the conveyance of typhus fever, relapsing fever, and trench fever; and fleas for the transmission of plague. Bed bugs, without convincing evidence, are suspected of conveying relapsing fever and kala-azar. Mosquitoes are responsible for the conveyance of malaria, yellow fever, dengue, and filariasis. In general, it may be said that, while the incidence of insect-borne diseases is at present negligible in Aberdeen, no assurance can be given that this immunity will be permanent. For this reason, and because it is important that the decline in verminous conditions in the community as recorded by the Medical Officer of the Education Authority should, if possible, be accelerated, it has been considered desirable to include here a short note on the methods of disinfestation practised by the Aberdeen Health Department.

Methods of Disinfestation.—Preventive measures in regard to insect-borne diseases are primarily directed to the destruction of the insects, and the patient is removed to vermin-free conditions of life. On removal to hospital, the patient is admitted to a cleansing ante-room, where complete disinfestation is secured before he is admitted to the common ward. The patient's clothes are removed, being rolled into a sheet wrung out of a disinfestant wash, and his body is thoroughly cleansed with a disinfestant soap, special attention being given to the head, since the head lice may also transmit infection.

All verminous clothing and bedding is removed and sterilised by steam. The verminous quarters are fumigated with a gaseous insecticide, every article in the room being freely exposed to the gas. Cleansing of the rooms is then secured by thorough washing with a disinfestant wash, and finally the rooms and everything in them are freely dusted with an insecticide powder.

The ambulance staff and the receiving nurses require to take special precautions to avoid verminous infection. Overalls fitting closely at the neck, wrists, and ankles are worn, and the hair is covered. Vaseline containing naphthalene or other volatile insecticide is smeared over the neck and wrists, and the clothing of the workers is impregnated with an insecticide.

Chemical insecticides fall into three main groups—gases, liquids, and solids—each of which has its uses. In practice, the only efficient *insecticidal gases* are sulphur dioxide gas and hydrocyanic acid gas, and of these sulphur dioxide is greatly to be preferred, in view of the danger of poisoning from hydrocyanic acid gas. In fumigating a room with burning sulphur, the chimney vent and all openings should previously be closed. Five lbs. of flowers of sulphur should be used for a room of ordinary size, and should be burned in two separate pans or pots simultaneously—2½ lbs. in each pan—placed over a basin or pail of water to prevent danger from fire. The room should be fumigated in this way for at least three hours. As regards *insecticidal liquids*, the following insecticide mixture is useful:—The mixture is made by dissolving ½ lb. of soft soap in a quarter of a gallon of hot water, adding 4 oz. of cyllin or izal or bactox, and 4 oz. of paraffin oil. This is stirred thoroughly until well mixed. Sufficient hot water is added to make the total quantity of the mixture up to a gallon. The mixture is used while still warm. The most active insecticidal liquid of all is made from soft soap to which 25 per cent. of tetrachlorethane has been added. This mixture, like the preceding mixture, has the great advantage of being non-inflammable. If used in a well-ventilated room, there is no danger of poisoning from tetrachlorethane vapour. It is particularly useful for shampooing verminous heads. It is, of course, essential that the eyes of the patient should be protected. Of *insecticidal powders*, N.C.I. powder, containing naphthalene 96 per cent., creosote 2 per cent., and iodoform 2 per cent., is the best. Pyrethrum, or Keating's Powder, is a less active but valuable substitute for N.C.I. powder. The vapour of naphthalene from N.C.I. powder is absorbed by liquid foods and gives them an unpleasant flavour. Pyrethrum is free from this disadvantage.

The destruction of lice and fleas is readily secured by the above-mentioned methods, but premises infested with bed bugs are more difficult to disinfest. Bed bugs cease to be prolific when prevented from feeding on man, but they are not killed by depriving them of human blood. Thus, they may remain alive and active for many months in houses which have ceased to be inhabited. Moreover, their resistance to several insecticides and the manner in which they can protect themselves by lurking in chinks in the woodwork of beds, floors, and skirting, makes their destruction still more difficult. It is not infrequently necessary to strip away the woodwork before a bug-infested house can be freed from these pests. Insecticidal liquids and powders are of limited utility in destroying bugs. Sulphur dioxide fumigation provides the best method of destroying them. Sulphur dioxide kills both the bugs and their eggs very rapidly, and the gas can be brought into intimate contact with every cranny in an infected room.

RAT DESTRUCTION.—Rats are a serious problem in preventive medicine. Plague is primarily a disease of rats, and the prevention of this infection resolves itself into a war upon these rodents. Rats, of course, transmit rat-bite fever, they are responsible for the persistence of trichinosis, and they are capable of transmitting the infection of the Gærtner group bacilli since they may be the carriers of these organisms. Attention has been directed afresh to the importanec of the destruction of rats by the appearance of cases of acute infectious jaundice in Scotland. The destruction of food, merchandise, and property by rats is so great that this alone would justify active measures of suppression, even although they were not responsible for the transmission of grave infectious diseases.

Prior to the coming into force of the Rats and Mice (Destruction) Act, 1919, the Town Council of Aberdeen in 1917 had entered into an agreement with certain manufacturers and merchants within the City to carry out a scheme for the prevention and destruction of rats. Within this scheme the Council authorised the appointment of a rat-catcher, who was attached to the Health Department and was required to devote his whole time to the duties of the appointment. A Joint Committee was constituted, composed of three members appointed by the Public Health Committee and an equal number of members appointed by the Contributors. The net expenditure under the scheme, after deduction of any grant from Government sources and any other receipts, was met one-half by the Town

Council and the remaining half by the Contributors. From its initiation, the scheme was a success, and a second full-time rat-catcher was appointed in 1918. The scheme continues in force, and is supplementary to the provisions of the Rats and Mice (Destruction) Act, 1919.

It seems impossible that the general extermination of rats should ever be accomplished, since the killing off of large numbers gives the survivors an easier living. The campaign against the rat requires a simultaneous campaign directed against the rat itself, its food supply, and its habitation. Traps are set for the rats. Food poisoned with arsenic, phosphorus, strychnine, barium carbonate, squills, or rat virus is laid down, and such natural enemies of the rat as cats and dogs are encouraged. Every effort is made to prevent the access of rats to food supplies by rendering all stores rat-proof. Rat burrows and nesting places are destroyed, and every effort is made to render human habitations rat-proof. In enclosed structures all rats can be killed with certainty by fumigating with sulphur dioxide gas. Sulphur dioxide fumigation has the additional advantage of at once killing fleas, which are the essential means by which plague is transmitted from the rat to man.

As regards practical means for poisoning rats, it has been found in Aberdeen that red squills gives the best results. It is deadly for rats, and is sold by the makers as quite harmless to domestic animals and human beings. This is practically true for the quantities used, as the experience of our own Rat Staff has shown, but it is advisable to take reasonable precautions against domestic animals having access to the poisoned bait. The three sizes of bottle on sale from the Health Department, viz., 5, 10, and 25 ounces, provide, according to capacity, sufficient poison for the preparation of 60, 120, or 300 poison-soaked pieces of bread bait—each bait being sufficient to kill one rat. To prepare, say, 60 baits, 5 oz. of the poison is mixed with an equal quantity of fresh sweet milk in a large soup plate, and about 60 squares of bread, a day old, obtained by cutting two slices, each half an inch thick, of ordinary loaf bread, into 64 pieces in all, are soaked in this mixture. The baits are laid late in the afternoon in or near the runs of the rats. If it is found that more than, say, one-half to three-fourths of the baits have disappeared by next morning, it shows that the rats are considerable in number in proportion to the baits laid, and that, therefore, fresh baits should be laid again next afternoon. If the baits again disappear in considerable measure, a further fresh supply of baits should be laid. This should be repeated until it is found that none of the fresh baits laid has disappeared. This probably means that all the rats have been poisoned or have migrated. Frequently, the first laying of baits suffices to poison or drive away all the rats; but the suggested additional layings will make this sure. The number of baits at each laying should, of course, be exactly counted and noted; and so also next morning the number of uneaten baits. The uneaten baits should be lifted, and should either be thrown away or be soaked again in some freshly made poison mixture and re-laid. The whole of the contents of the poison bottle purchased should, therefore, not be used for the first laying of baits. Preferably, not more than one-half should be used, and, accordingly, only one-half of the number of baits prepared which the bottle is capable of supplying. It is recommended that the baits laid each afternoon should be freshly prepared. It is strongly advisable to persist in laying the bait day after day—or with no greater interval than one blank day at a time—until the bait has ceased to be eaten.

Where rats are regularly recurring in any premises, it means usually that there are holes somewhere by which rats are getting access to the premises. Not infrequently the holes are the end of burrowings leading to badly constructed drains, into which the rats find access, or from which they come. Rats like to disport in water, especially sewage water or polluted ditches. All such burrows should be searched for, and closed up, and the drains should be made proof against rat access, which also means against escape of sewage effluvia. All granaries and food stores should be constructed, or, if practicable, reconstructed on rat-proof principles, viz., with concrete floors, with unlathed walls, and generally without out-of-sight spaces in which rats can find refuge and breed. All doors should be close-fitting, especially at bottom, and be plated at bottom with sheet-iron, if necessary. All drainage connections should be carefully overhauled, especially if long in use, and should be made rat-proof. Where rat holes in walls or floors have to be stopped, a mixture of good cement and broken glass should be used Finally, the contents of stores should be so arranged, as far as practicable, that the rats cannot too easily find refuge and security for nesting within the contents; and, by regular cleansing, the premises should be kept as free as possible from garbage, on which rats may feed. It always pays to be at some trouble and expense to keep out rats. The Health Department is willing at all times to place their experience at the free disposal of occupiers desirous of advice in the prevention or removal of rats.

Typhus Fever.

There were no cases of this disease during 1924. With the exception of three cases in 1911, all of which were confined to one family, there have been no cases of typhus in Aberdeen since the epidemic of 1905.

Malaria.

Three cases were reported. No deaths. In all the cases the disease was contracted abroad, and the cases were notified in Aberdeen when recurrences, relapses, or other manifestations of this, the most protean of all diseases, compelled the sufferers to seek medical advice.

Trench Fever.

No fresh cases of this disease have been reported in Aberdeen since trench fever was made compulsorily notifiable in 1919.

Infective Jaundice.

In April, 1924, prior to notification, two suspected cases of this disease, in young children of school age, were admitted to the City Hospital for observation. No actual symptoms of jaundice were noted, while spirochætal examinations of the blood and urine, and also animal inoculations, were negative. Such symptoms as were present were probably explained by a mildly acute infection of a catarrhal nature of the respiratory tract. Since infective jaundice became compulsorily notifiable, no cases have come to the knowledge of the Health Department.

In terms of the Public Health (Infective Jaundice) Regulations (Scotland), 1924, made by the Scottish Board of Health under the Public Health (Scotland) Act, 1897, acute infective jaundice was made compulsorily notifiable as from 26th December, 1924, for the period ending 31st December, 1925. In making acute infective jaundice notifiable, the Board of Health had in view the occurrence, early in 1924, of cases of this disease apparently originating among colliery miners employed in pits in East Lothian and Midlothian, in which cases the presence of the leptospira icterohæmorrhagica, the organism causing the disease, was demonstrated. A further outbreak of the disease occurred recently in Edinburgh, the infection having apparently been brought to this country by a child who had come from the Malay States. The Board had also been informed that two outbreaks of disease occurring in north-eastern Scotland, although not so diagnosed at the time, were later suspected to have been infective jaundice. The Board accordingly took the view that there is a risk of other outbreaks being overlooked, and decided to make the disease compulsorily notifiable throughout Scotland, in terms of the above Regulations.

In accordance with the information contained in pages 56 and 57 of the 1922-23 Annual Reports of the Medical Officer of Health, the incidence of leptospira icterohæmorrhagica infection in rats caught in the City of Aberdeen has been investigated, and it has been found that 24 per cent. of the rats examined showed the presence of typical leptospira either by direct examination of the tissues or as a result of animal inoculation. In the *British Medical Journal* of 29th November, 1924, Buchanan records the discovery of the causal organism of spirochætal jaundice in the roof slime formed by organisms which yielded a jelly-like or zooglœa mass found in an infected coal mine, this slime forming apparently a favourable medium for the growth and continued life of the leptospira, which lived symbiotically with many other species of organisms. Buchanan suggests that pathogenic leptospira, capable of producing in guinea-pigs pronounced and fatal spirochætal jaundice, can exist in mud and slime in situations inaccessible to rats. While the matter has not been finally determined, the probability is that infection in man commonly occurs as a result of contamination of water or food with the urine of infected rats. Infection from man to man can only be transmitted by means of infected urine. Acute infective jaundice caused by the leptospira icterohæmorrhagica is a distinct and separate disease from rat-bite fever, which appears to be caused variously by the Spirochæta morsus murium and the Streptothrix muris ratti.

The initial symptoms of spirochætosis icterohæmorrhagica, as described by Buchanan are as follows:—(1) The onset of the disease is usually sudden and manifests itself by giddiness, headache, and muscular pains. (2) The temperature rises quickly with a steep or swinging ascent from the first day of illness, reaching a maximum on the 2nd, 3rd, or 4th day. The initial pyrexia lasts on an average 10 days. (3) Loss of appetite, vomiting, great weakness, and diarrhœa are complained of in the acute stages. The conjunctivæ become injected, and herpes, liable to become hæmorrhagic, may appear on the lips. (4) Jaundice usually appears between the 3rd and 6th day and reaches its height about the 10th or 12th day. The disease may occur without jaundice. (5) Constipation becomes marked and tenderness in the upper abdomen is usual. The tongue is furred and brown. (6) Early in the illness slight epistaxis, hæmoptysis, or small palatal hæmorrhages are valuable diagnostic signs. (7) Albuminuria is a usual accompaniment in the febrile stage.

In connection with the examination of specimens from suspected cases of the disease, it is to be noted that the leptospira are present in the blood during the first six days of the disease, and their demonstration commonly requires guinea-pig inoculation. From 5 to 10 c.c. of blood are taken from the patient and added to sufficient 1·5 per cent. sodium citrate to prevent clotting. Thereafter several guinea-pigs are inoculated. After the sixth day the urine usually contains the leptospira, and these may be demonstrated by dark ground illumination methods. Several guinea-pigs should be inoculated with urine to confirm the diagnosis. It is essential that all specimens for examination should be sent to the laboratory at the earliest possible moment after collection. In connection with the taking of specimens in Aberdeen, it has been arranged that the services of Dr. Smith will be available to give whatever assistance may be considered necessary.

An anti-serum for use in the treatment of cases of infective jaundice has been put on the market. It is suggested that 50 c.c. of the anti-serum should be injected as an initial dose. In connection with the anti-serum treatment of the disease, it has to be pointed out that the laboratory examination of blood or urine specimens for the presence of leptospira takes from 7 to 12 days to complete, and, accordingly, in a suspected case of acute infective jaundice the anti-serum should be administered without waiting for laboratory confirmation of the diagnosis. Supplies of the anti-serum can be obtained free of charge on request at the City Hospital.

METHODS OF DISINFECTION.

The Cleansing and Disinfecting Departments at the City Hospital continue to carry out their functions.

In general, it may be stated that sunlight, pure air, and cleanliness are the most important agents in maintaining health and affording protection against disease. Frequently, however, it is necessary to take special measures to render innocuous infectious material. Adequate methods of disinfesting and disinfecting by steam or dry heat are available and kill both insects and bacteria. The chemical agents available for disinfestation in insect-borne diseases have already been sufficiently described.

It is important to note that there is a sharp line of demarcation between chemical agents which are efficient insecticides and chemical agents which are efficient bactericides. Thus, as has already been pointed out, sulphur dioxide gas is an admirable insecticide when used in sufficient concentration as by burning

5 lbs. of flowers of sulphur in an ordinary sized room of 1,000 cubic feet capacity; but sulphur dioxide is practically worthless as a bactericide. On the other hand, the most admirable gaseous bactericide is formaldehyde when used in sufficient concentration; but formaldehyde is practically worthless as an insecticide. The most generally convenient way in which to make formaldehyde gas available for disinfecting an ordinary sized room of 1,000 cubic feet capacity is to add 2 pints of formalin to 9 ozs. of potassium permanganate in a metal basin. About one-fifth of the formaldehyde is oxidised to formic acid, and the heat thus generated vaporises the remainder of the formaldehyde which then exerts its bactericidal action and also drives off water vapour which reinforces the action of the gas. The coal tar disinfectants are the most generally useful liquid bactericides, those such as cyllin, izal, or bactox with a carbolic acid co-efficient of twenty being commonly employed in dilution of 1 in 100. The time and temperature factors in any process of disinfection must, of course, be adjusted.

It is obvious that a great deal of the terminal disinfection that has been practised by the Health Department in former years is useless. Disinfection after such a disease as measles is obviously unnecessary. Even in certain cases of scarlet fever where the infection lingers, the continued infectivity is derived from the carrier condition of the patient and not from his surroundings. On the other hand, in diseases where the infecting organism is known to be very resistant, as in tuberculosis and the spore-bearing infections, terminal disinfection can clearly be justified; and this holds good likewise in those diseases where the infecting organism may have no great resistance to bactericides, but where the minutest dose of the infection is apparently capable of originating the disease on account of the extreme degree of human susceptibility to the infection. At any rate, some such explanation serves to explain the apparent need for terminal disinfection in small-pox.

In view of the more accurate knowledge which is now available of the duration of infection in the specific fevers and of the varying resistance of pathogenic micro-organisms to disinfectants, arrangements have been made to modify the methods of disinfection practised in Aberdeen. Infection ought to be controlled at its source, and, accordingly, it has been decided to increase the number of visits paid by health visitors to cases of infectious diseases being nursed at home, so that increased instruction can be provided regarding the immediate disinfection of infectious discharges, excreta, and fomites, and to discontinue some of the routine terminal disinfection which was formerly applied in a somewhat indiscriminate fashion in all cases of infectious diseases treated at home.

CHAPTER II.

CANCER.

The former attitude of apathy and indifference which people in general exhibited to the whole subject of cancer has recently been replaced by a widespread interest in this disease, which is now the greatest single cause of death in this country. This recent development of popular interest in cancer is largely the outcome of the education and propagandism that has aroused public interest in general health questions. It has been stimulated by articles on cancer appearing in the daily press and in popular magazines. That people are eager and willing to receive instruction on health matters of the widest description is one of the most encouraging features of modern life. An informed public opinion on cancer questions is essential if the present large number of needless deaths from the disease is to be avoided.

The cause of cancer is unknown, and in the absence of accurate information there has been much conjecture as to the etiology of the disease, and unfortunately many of these conjectures, entirely unsupported by scientific evidence, have been accepted as established facts, and certain distinguished surgeons and dietarians have gone out of their way to preach such false cancer doctrines—a most reprehensible procedure in view of the fact that these preachers could have known better had they taken the trouble to make use of the fundamental cancer knowledge to which they had access. A single example will serve to illustrate this point. Thus volumes have been written intended to prove that it is the food we eat and its faulty assimilation that causes cancer, and yet long and patient research on cancer metabolism has given no support whatsoever to this view. On the contrary, no constant or significant differences have been discovered in the absorption and utilisation of the materials necessary to bodily existence between normal and cancerous animals, nor is there any evidence of vitamin deficiency having an influence in retarding the growth of transplanted tumours in rats, or of the presence of a tumour accelerating the onset of symptoms of vitamin deficiency. The Health Department is deeply concerned with the nutrition of the community, and in the section of this Report dealing with Metabolism and Disease it is shown that the importance of adequate nutrition in maintaining health can scarcely be exaggerated; but the conjuration of malnutrition as a cancer bogey cannot be permitted.

With a view to obtaining an informed public opinion on cancer that would be directed to the prevention of cancer deaths, the Ministry of Health have issued to Local Authorities a series of reviews by the Departmental Committee on Cancer, summarising the present position of different cancer problems, and the fourth memorandum (Cancer—IV. Circular 516. Ministry of Health. 1924) is the most important of the series, since it summarises the results of the experimental research work on which the present fundamental knowledge of cancer is based.

Cancer Theories.

It is pointed out in the cancer memorandum that the various experiments devised to test the value of three main conceptions of the origin of cancer have had so far a negative result. These three hypotheses are as follows:—

1. The Hypothesis of a Microbic Origin, in which it is supposed that cancer is due to invasion by a parasitic micro-organism, and is therefore of an infective nature.
2. The Embryonic Hypothesis, which is to the effect that during fœtal life small islands of cells become isolated from their parent tissue, and in later life take on an independent form of growth.
3. The Gametic Hypothesis, which, arguing from a pretended resemblance between the method of division of cancer cells and that of the germ cells (which differs from that of all other normal tissues), supposes that cancerous growths depend on the cancer cells having reverted to the type of division peculiar to the sexual cells.

At the time the review was prepared, none of the experiments inspired by these hypotheses had led to the production of a new growth of more than a temporary character.

It is pointed out, on the other hand, that the experiments devised to test the value of the fourth main conception of the origin of cancer have had positive results, a positive achievement of the greatest importance. This fourth hypothesis is as follows:—

4. The Irritation Hypothesis of Virchow, in which the conception is that chronic irritation is of great causative importance in the production of cancer.

The experiments inspired by this hypothesis have reference to the irritation produced by (*a*) radiant energy, (*b*) animal parasites, (*c*) chemical irritants, and (*d*) mechanical irritants.

(a) Radiant Energy.—In connection with the effect of radiant energy in producing cancer, the skin carcinomata due to intense insolation are well known in man. Sarcomata have been produced in rats by X-rays, repeated exposure over about a year being necessary. Carcinoma of the rabbit's ear has been produced by the same agency after a still longer interval. No such success has followed long-continued repeated exposure to radium.

(b) Animal Parasites.—As regards the effect of animal parasites in producing cancer, examples of carcinoma of the bladder are met with supervening on the chronic ulcerative condition and alkaline urine of bilharzial bladders due to infection by the eggs of a parasitic worm, *Schistosoma hæmatobium*. Parallel with this, two forms of malignant new growth in the rat have been found to be constantly associated with the presence of animal parasites. These parasites are the *Gongylonema neoplasticum*, a nematode or round worm, occurring in the stomach of rats and leading to carcinoma of the œsophagæal end of the stomach; and the cystic stage of a tape-worm, *Tænia crassicollis*, occurring in the liver of rats, which

frequently sets up sarcomatous growth in the cyst walls. The intermediate host of the *Gongylonema* is the American cockroach, and these can be infected experimentally by feeding with the fæces of infected rats. Rats in turn are infected by allowing them to eat infected cockroaches. The larvæ encysted in the muscles of the cockroaches are set free in the stomach of the rats. They burrow in the epithelial lining of the stomach, and in a certain proportion, which varies with the race of rats employed, carcinoma develops. The definite host of *Tænia crassicollis* is the cat, and rats are infected by contaminating their food with the fæces of infected cats. Sarcoma develops in about 50 per cent. of the rats successfully infected. Although cysts in the liver of the rat are usually multiple, the sarcomata are usually solitary. The age of the animals does not seem to be of importance in either of these sets of experiments, young animals giving as high percentages of new growth as do old ones. Repeated injection of these parasites in a dried condition or of extracts of them does not produce new growth. It is therefore believed that the long-continued application of substances excreted by the parasites is responsible for the result. This conception ranges these experiments along with those performed with chemical irritants.

(c) Chemical Irritants.—Examples of industrial cancer due to chemical irritants have long been known. Thus, there is the cancer of chimney-sweeps due to soot, of workers in the Scottish paraffin industry due to crude paraffin, of mule-spinners similarly due to mineral oil, and of aniline dye workers, whose cancer of the bladder has been attributed to the inhalation of minute quantities of aniline vapour. The experimental production of cancer by the repeated application of gas tar was put on a sound basis in 1915, as a result of the work of Tsutsui, Fibiger, and Bang. All animals are not equally susceptible, and while tar may initiate true skin cancer in three or four months in a few mice out of a large number, in the majority, six to nine months is necessary; and in some animals, again a few in number, no result can be obtained, although tarring be continued for eighteen months. Since mice die of old age at about two years, irritation to be effective has to be continued through a proportion of their life which corresponds to twenty or thirty years in man. If tarring be discontinued after three or four months, the cancer develops after a latent period which may be shortened if another form of injury, namely, scarification, is combined with tarring. There is a close analogy between this finding and the association in man of cancer of the tongue with rough tooth stumps, smoking, and syphilis. Similarly, cancer has been produced experimentally with unrefined paraffin oil and with arsenic in the form of arsenious acid, this latter being the only pure substance which has been used with success as a cancer producing irritant. Attempts to identify chemically the substance in tar which induces cancer have not yet been successful, beyond its limitation to the fraction boiling at 300-350° C. An interesting variant to these experiments is the production of sarcoma in mice and rats by repeated subcutaneous inoculation of tar. This is of importance as showing that the refractoriness of rats to tar painting only holds for the covering epithelium and not for connective tissues, which in rats are much more frequently the site of new growths. Examples occur in the sarcomata

due to animal parasites already mentioned. One of the most important observations of all is that it has not been found possible to induce carcinoma in animals which have already developed cancer either from application of tar or spontaneously. This seems to indicate that, although cancer arises as a local process, systemic generalised changes accompany its development. The nature of these changes is quite obscure.

(d) Mechanical Irritants.—Since the publication of the fourth memorandum of the Departmental Committee on Cancer, an interesting observation has been made by Leitch, who has been able to induce carcinoma in guinea-pigs (1) by means of gall stones, *i.e.*, by pathological substances wholly elaborated in the human body, and (2) in the control of guinea-pigs by means of pebbles, *i.e.*, by substances which may be supposed to be chemically inert. These experiments would appear to indicate that the chemical composition of the gall stones was not a factor in the production of the results.

Rous Sarcoma.

The infective sarcomata of the domestic fowl, discovered by P. Rous, appear to be transmissible without the intervention of intact cells. Cell-free filtrates, as well as tumour fragments, can transmit the disease, and the active principle withstands drying, the action of glycerin, and heating to 45° C. for half an hour.

Since the publication of the cancer memorandum, a contribution of the very first importance has been made to our knowledge of the Rous sarcoma by A. Carrel (*Journal of the American Medical Association*, 17th January, 1925), who by the methods of tissue culture has produced cultures of the Rous sarcoma. Methods of tissue culture would appear to have received much more attention in America than in Britain.

Using the Rous virus obtained from filtered Rous sarcoma extract, Carrel has shown that the penetration into large mononuclear leucocytes of the agent of Rous sarcoma gives these cells the property of secreting the Rous agent and of dying prematurely, probably without interfering for some time with their reproductive power. It also rendered them capable of digesting the culture medium and of assuming the appearance of fibroblasts. But these last properties are possibly the consequence of the formation of necrotic tissue by the dead monocyte. The malignant monocyte differs from the normal one chiefly because it is a diseased cell which is short-lived. But it is far from being anarchic, or from possessing as much growth energy as an embryonic cell, as is supposed to be the case according to the classical hypotheses.

It appears as a paradox that a tumour endowed with the power of unlimited growth within the organism should be built up by cells that have low resistance and shorter life than normal cells. However, this contradiction is apparent only, and an explanation of the genesis of the Rous sarcoma can be based on the properties of the malignant monocyte.

When the agent discovered by Rous penetrates or develops within a fowl, it is destroyed in a short time by the humours, unless it is taken up by a tissue macrophage or a monocyte. The infected macrophage continues to multiply and infect other macrophages, although it eventually dies. Then the dead macrophages attract normal macrophages, which become modified in their turn. While this process is going on, the growth promoting substances or trephones contained in the macrophages are set free, and bring to the fibroblasts and other cells of the neighbouring tissues the food material and stimulus necessary for multiplication. Since the Rous agent propagates itself within the cells, this process can go on indefinitely, and hence the tumour grows without limit in size.

This explanation of the mechanism of the growth of a sarcoma may or may not prove to be strictly true. However this may be, the fact will remain that the differences between a normal and a malignant cell can be accurately analysed by Carrel's method, and that the tumour cell as described is a diseased monocyte which propagates the Rous agent, slowly degenerates, and ultimately dies. It also appears that, in the growth of Rous sarcoma, the macrophages possess a function quite opposed to their classical *rôle* of defenders of the organism against bacteria and foreign substances. They protect the active agent of the Rous sarcoma against destruction by the humours, and supply the conditions necessary to its propagation.

Public Health and Cancer Research.

It has already been pointed out that an informed public opinion on cancer questions is essential if unnecessary deaths from cancer are to be prevented, and accordingly the practical hygiene of the community is actively concerned with the trend of experimental cancer research.

It seems unfortunate, therefore, from this point of view that the embryonic and gametic hypotheses should have so obsessed the minds of British cancer research workers for the past twenty years. The recent observations of Sambon are of interest meantime merely as an example of a possible line of inquiry which the cancer problem suggests to a mind not wholly hypnotised by contemplation of the classical conceptions. It is not suggested for a moment that cancer research should be anything other than free and devoid of external control. It is not suggested that "team work" can replace the free unfettered excursions of the imagination of the individual worker, or be a substitute for his original and fertilising thought. At the same time it cannot be denied that the fertilising thought that has endowed the malignant cell with an intrinsic fecundity and formulated the fatalistic cancer theory of the germ plasm and determinants has apparently exhausted the excursions of the imagination of a considerable number of cancer research workers, and it is greatly to be hoped that Carrel's brilliant work on the essential characteristics of a malignant cell may provide an energising influence.

Sufficient has been said to make it obvious that the routine transmission of a carcinoma through a series of mice or its experimental production by tarring can no longer be dignified by the designation of cancer research.

Cancer Statistics.

All figures relating to the mortality or to the incidence of cancer in this country are vitiated by fallacies, the chief of which is due to the difficulty of correctly diagnosing cancer. Conclusions based on the *post-mortem* records of the large teaching hospitals disclose an error, due to mistaken diagnosis, amounting to 30 per cent. The general effect of this fallacy is that the recorded mortality from cancer varies for localities and for countries according to the efficiency of the medical service, and that nowhere does the recorded mortality reach the actual incidence of the disease. Another fallacy arises when the incidence of cancer in civilised communities is compared with that in uncivilised communities. Cancer increases in frequency as age advances, and in order to make a comparison it is necessary to compare persons of corresponding age. In an uncivilised community there are no records permitting such a comparison to be made. All that is known is that in such a community people die at an earlier age. In an uncivilised community also, there is no efficient medical service. It is difficult, however, to explain certain differences in international cancer statistics as being due to obvious statistical fallacies in countries in which death certification is fairly complete. Thus the death-rate from cancer of the breast and female genital organs in England is double that of Holland and Italy. The intensive study of this difference which is at present being undertaken by the Cancer Sub-Committee of the League of Nations may provide information of great importance.

Some interesting figures indicating the duration of cancer in untreated cases have been extracted by Lazarus-Barlow and Leeming from the records of the Middlesex Hospital, extending over a period of forty years. It is not suggested that the figures are large enough to justify any general conclusions being made from them. The Middlesex figures show (*a*) that the earlier the age of onset, the shorter the total duration of the untreated disease, and (*b*) that the natural duration of cancer at one and the same primary site is longer in the female than in the male. Taking the age-period 45-54 years in each case, it is found that the mean duration of untreated cancer of the breast in females was 39·2 months; of cancer of the cervix, 21·4 months; of cancer of the tongue and mouth in males, 16·9 months; of cancer of the rectum in males, 20·1 months; and of cancer of the rectum in females, 26·3 months. As regards the results of treatment, Dr. Janet Lane-Claypon calculates (Ministry of Health Report 28) that with cancer of the breast left without operation, a patient, say, at the age of 50, has an expectation of 3½ years of life from the date of the first sign of the disease; if the patient is subjected to complete operation, without distinction of the stages of the disease, her expectation is increased to 6 years and 8 months, but if the operation be performed early, this expectation is almost doubled.

Having all these statistical points in mind, reference may be made to the Aberdeen figures. The cancer death-rate was 14·3 per 10,000 of the population in 1924, as compared with a rate of 13·1 in 1923. During the 1919-1923 quinquennium, the average rate was 13·3. The death-rate has risen from about 5·6 per 10,000 of the population in the first years of registration to a rate of 15·3 in 1922, and has thus become nearly three times as high. This rate for 1922 is very distinctly the highest on record. The cancer death-rate remained practically unaltered for the first twenty years of registration, but from 1875 it began to grow fairly rapidly, and since then has almost trebled itself. It is interesting to note that the mid seventies, which marked the beginning of the modern decline in several diseases, were associated with the commencement of the increase of cancer. Thus the tuberculosis death-rate has fallen from about 35·0 per 10,000 of the population in 1875 to a rate of 13·3 in 1924, a decline of almost two-thirds in the tuberculosis death-rate. So also in 1883, when the decline in the major infectious diseases was already very considerable, the average age at death was 34·2 years, as compared with an average age at death of 44·7 years in 1924.

Surgical procedure still remains the only effective means of extirpating malignant growths, and the sooner it is resorted to the more easily can the growths be removed and the return of the disease prevented. A notable advance in treatment has been made in preventing recurrence after operation and in the alleviation of certain inoperable cases by the application of X-rays and radium therapy. As will be seen from the table on page 57, it is mainly after middle life that cancer manifests itself.

As has been pointed out in preceding annual reports, the death-rate from cancer continues to be distinctly higher in the three east coast towns, Edinburgh, Dundee, and Aberdeen, than in the three west coast towns, Glasgow, Paisley, and Greenock, the average in 1924 for the former towns being 15·5, and for the latter 12·4. This seeming difference in the mortality from cancer between the two sets of towns is not to be explained by difference in diagnosis by the medical practitioners of the different towns; but before accepting the figures as being truly indicative of an increased cancer mortality in the east coast towns, it is necessary to make corrections for the age and sex distribution of the population and to standardise the figures for comparison. Accordingly, the accompanying table has been prepared, showing the death-rates from cancer in the six principal towns of Scotland, the rates being based on the average annual deaths for 1920-1924 per 10,000 of sex population as at the 1921 census at the various age-periods. The uncorrected death-rates for these five years for Edinburgh, Dundee, and Aberdeen average 15·5, 15·6, and 13·8 per 10,000 of population respectively, as compared with an average of 12·7, 11·6, and 12·0 for Glasgow, Paisley, and Greenock. Reference to the accompanying table, however, shows that, when corrected for age distribution, the death-rates for males in Edinburgh, Dundee, and Aberdeen were 13·6, 14·1, and 12·0, respectively, and in Glasgow, Paisley, and Greenock the corresponding rates were 13·6, 11·5, and 13·1. So also for females, when corrected for age distribution, the death-rates in Edinburgh, Dundee, and Aberdeen were 15·5, 15·6, and 15·0, respectively, and in Glasgow, Paisley, and Greenock the corresponding rates were 16·3, 14·2, and 15·8, respectively. It is obvious, therefore, that by correcting for age and sex the apparent increase of mortality in the east coast towns as compared with the west coast towns straightway disappears. If, alternatively, the standard cancer death-rate for each of the cities is calculated, and the corrected cancer death-rate determined by multiplying the recorded death-rate by the factor for correction, that is, the ratio between the standard cancer death-rate of the country and that of the town in question, it is found that the corrected death-rates for the same five years, 1920-24, for all ages and both sexes in Edinburgh, Dundee, and Aberdeen were 14·5, 14·8, and 13·6, respectively, as compared with rates of 15·0, 12·9, and 12·3 for

DEATH RATES FROM CANCER.

Six Principal Towns in Scotland.

(Based on the Annual Average Deaths for 1920-1924 per 10,000 of Sex Population as at 1921 Census at various Age-Periods.)

	AGE-PERIOD.							ALL AGES.	ALL AGES Corrected for Age Distribution.
	0--25.	25—35.	35—45.	45—55.	55—65.	65—75.	75+.		
A.—MALES.									
Scotland,	0·3	1·2	4·3	16·5	47·3	91·9	111·2	11·3	11·3
East Coast Towns—									
Edinburgh,†	0·2	1·1	3·5	21·0	62·8	110·9	115·4	14·0	13·6
Dundee,	0·3	1·0	8·9	16·0	62·1	117·6	130·8	14·1	14·1
Aberdeen,	0·5	2·0	4·7	19·9	48·5	94·9	102·5	11·7	12·0
West Coast Towns—									
Glasgow,	0·4	1·2	5·4	20·7	57·0	113·5	118·3	11·8	13·6
Paisley,	0·2	1·7	6·0	14·1	45·5	99·2	111·7	10·3	11·5
Grecnock,	0·5	1·5	7·5	18·7	53·3	106·5	116·6	11·0	13·1
B.—FEMALES.									
Scotland,	0·3	2·0	8·4	23·4	49·1	81·3	113·4	13·8	13·8
East Coast Towns—									
Edinburgh,	0·4	2·5	8·8	22·6	54·1	95·7	140·3	16·8	15·5
Dundee,	0·2	2·1	10·3	28·3	59·9	83·6	111·9	16·8	15·6
Aberdeen,	0·3	3·1	9·9	27·4	47·0	85·3	131·9	15·5	15·0
West Coast Towns—									
Glasgow,	0·3	2·4	10·5	27·7	55·9	95·6	135·4	13·6	16·3
Paisley,	0·2	2·7	8·3	27·9	46·8	79·5	119·0	12·7	14·2
Greenock,	0·5	1·6	7·9	30·6	63·7	89·8	98·4	13·0	15·8

† Averages for 1921-1924 only.

Glasgow, Paisley, and Greenock—so that again the apparently continual difference in mortality between the east and the west coast towns is found to be unreal. It is interesting to note that the seeming difference in cancer mortality between east and west coast towns which has attracted some considerable attention would not have been given that prominence if the necessity for confining comparisons to populations of equivalent age and of the same sex had been observed.

Cancer Propagandism.

In 1920, Aberdeen Unversity Court established the Farquhar-Thomson Lectureship, which was founded by Mr. John Thomson, Aberdeen University Press, in memory of his son, Mr. John Farquhar-Thomson, who was an Arts graduate of the University. In the founder's words, the subject of the lectureship is—"The structure and functions of the human body," and the University Court appoint annually a member of the University teaching staff as lecturer.

In 1924-25, Professor Marnoch, C.V.O., Regius Professor of Surgery in Aberdeen University, delivered the Farquhar-Thomson lectures. In the course of his lectures he directed attention to the urgent need for the education of the public as to the facts about cancer, if the prevention of unnecessary death from the disease was to be secured. With this end in view, the Town Council, in terms of the Council Minutes of 19th January, 1925, authorised a publicity campaign by means of advertisement in the daily press and the issue of an instructional leaflet on cancer. In preparing the instructional leaflet, the Memorandum on Cancer issued by the Ministry of Health to Local Authorities and adopted by the British Red Cross Society for publicity purposes was available as a guide, but it was considered that the form of the Memorandum, while wholly suitable for its original purpose, would appeal mainly to educated opinion and would largely fail to interest the mass of the people requiring instruction. There was also available for guidance the instructive Health Leaflet on Cancer issued by the United States Public Health Service, and it was considered that the form of this leaflet was admirably adapted for publicity work. It was accordingly used as a model for the Aberdeen effort, and the following instructional leaflet is now on issue at the City Health Department and Welfare Centres:—

HEALTH DEPARTMENT—CITY OF ABERDEEN.

CANCER.

Facts which Every Adult Ought to Know.

In his recent Farquhar-Thomson lectures, Professor Marnoch, C.V.O., Regius Professor of Surgery in the University of Aberdeen, has again drawn attention to the urgent need for the education of the public as to the facts about cancer, if the prevention and cure of this disease are to be secured.

It must clearly be recognised that the cure of cancer depends mainly on its early recognition and treatment. Moreover, if certain very definite conditions which are now known in many cases to precede cancer are avoided or cured, the disease may be prevented. The feeling of despair and the sense of fatalism with which the average individual regards cancer are due to the delay in seeking treatment with the result that the vast majority of cases are recognised only at a stage when cure is impossible. Two things are required if the unnecessary sacrifice of life by cancer is to be prevented. First, people must know the danger signals and recognise their significance in time; second, there must be widespread understanding of the hopeful message of modern medical science that many *cases of cancer in the early stages are* *curable.* Tuberculosis is no longer dreaded as equivalent to a death sentence, for the public have come to understand the disease and how it may be arrested. In the same way the chance of the cure of cancer would be greatly enhanced if intelligent adult people understood the elementary facts about the disease.

Prevalence of Cancer.

During the past ten years, an average of 5,702 deaths from cancer have occurred each year in Scotland. During the same ten years, tuberculosis caused an average of 6,823 deaths ; pneumonia an average of 7,432 deaths; heart diseases an average of 6,829 deaths ; and diseases of the kidney an average of 2,037 deaths. In Aberdeen alone, cancer is responsible for an average of 206 deaths each year. Cancer thus ranks among the leading causes of death. Not only so, but the disease is rapidly increasing in its incidence, apart altogether from the fact that the duration of life is increasing with the result that a larger number of people are reaching the cancer age-periods.

Age at which Cancer is Most Frequent.

Cancer is almost exclusively a disease of adult life. About 97 per cent. of all deaths from cancer occur at ages over 35 years. At ages over 35, one person in eight dies of cancer. The terrible tragedy of the cancer problem, however, depends on the fact that *at present nine cases out of ten are fatal*, and this is *due largely to delay in seeking treatment.*

Sites of Cancer.

Cancer occurs in a variety of forms, affecting practically every organ or part of the body. The annual reports of the Registrar-General for Scotland show that cancer of the stomach and liver accounts for 1,832 deaths annually ; cancer of the intestines, rectum, and abdomen causes 1,372 deaths ; cancer of the mouth, throat, and gullet, 585 deaths ; cancer of the female genital organs, 570 deaths ; and cancer of the breast, 491 deaths.

Increased Susceptibility of Women to Cancer.

So susceptible are the special organs of women to this disease, that one-seventh of all female deaths above the age of 35 years are found to be due to cancer, while only one death in every nine of men is due to this cause. If we exclude deaths from cancer of the breast and womb, the relative frequency of most other forms is very distinctly higher in males than in females, and especially is this true of cancer of the lip and tongue. The great susceptibility of the breast and generative organs of women to cancer, makes this disease of special interest to women, and particularly to women of middle age. It has been estimated that, between the ages of 35 and 45, three times as many women as men die of cancer, and, between the ages of 45 and 50, twice as many die.

How Cancer Develops.

The living cells which form the tissues of the body are constantly growing and dying off according to certain laws which we do not yet completely understand. Sometimes certain of these cells begin to grow and develop along lines which are not in harmony with the usual order. A little group of the cells seems to form a kind of lawless colony which constitutes an unhealthy and growing spot in the body. This spot may grow in the skin, in the breast, in the stomach, in the throat, or in other parts of the body. Frequently the cells form a little hard nodule or lump which can easily be detected by the sense of touch, and which can very easily be removed at the beginning. If the original mass is not removed, it usually continues to grow and to penetrate into the surrounding tissue. This penetration, indeed, is the fatal difference between a harmless growth like a wart and a malignant growth like cancer. Finally a large mass is formed, and minute portions become detached and are carried by the circulation of the blood or lymph to other parts of the body, where they continue to grow wherever they are deposited, and new cancerous growths are the result. If the first little growth is excised or removed cure is often secured. If it is allowed to spread, there results a dissemination of the disease which must necessarily have a fatal ending.

Cause of Cancer.

It has not yet been discovered what makes the first small cell or group of cells change their character and take on that extraordinary power of uncontrollable and malignant growth, but we do know that cancer often arises after long continued local irritation of various kinds and sometimes in benign growths or ulcerations. Cancer of the lip and mouth has been known to come from burns from pipe stems or constant irritation from bad teeth or badly fitting dental plates. Cancer of the stomach may follow ulcer of the stomach. Cancer of the womb has frequently been traced to neglected tears (from child-birth) and ulceration ; cancer of the skin from irritated moles or warts ; and breast cancers from lumps which were at first benign (harmless). In a true sense prompt recognition and treatment of any of these pre-cancerous conditions may really *prevent* cancer. Persistent ulcerations, cracks and sores, warts, moles or birth-marks, which change in appearance or grow larger, should be removed.

DANGER SIGNALS OF CANCER.

The most dangerous thing about cancer is the fact that its onset is usually painless and insidious. If cancer in its beginning caused as much pain as does an ordinary toothache or earache, people would at once take warning and most cases would be attended to without the fatal delay. In cancer, however, pain is usually not present at first. It is, therefore, the part of wisdom for all intelligent adults to know the commonest symptoms or danger signals of the more important types of the disease. These signals do not necessarily mean cancer, but they should lead to a prompt consultation with a qualified medical practitioner.

Cancer of the Breast.—This is one of the sites of cancer in which early detection of anything wrong is comparatively easy, and on this depends the prospect of cure. Nevertheless, the disease spreads rapidly from this locality, and immediate treatment is imperative. In general, cancer is not painful during the curable stages, and in the breast in particular any lump demands prompt and careful attention. It is of vital importance, therefore, to note—

(1) That while many lumps or sores in the breast are not cancer, some of them may turn into cancer ;
(2) That sores, nodules, or lumps in the breast in women over thirty years of age are especially important ;
(3) That all sores, nodules, or lumps in the breast at any age should be promptly seen by a doctor, since, as a rule, those that persist for a month or more demand removal.

The operation for the removal of a small lump is comparatively trifling, and little or no disfigurement takes place if the lump proves benign. It should be remembered that any lump which is allowed to persist until it is recognised readily as cancer has already reached the point where any operation must be extensive, and where the disease will prove fatal if further neglected.

Cancer of the Womb.—Every woman should be well acquainted with the main danger signals of this form of cancer, and although these are not necessarily certain signs of cancer, they are warnings which should lead to immediate consultation with a doctor and to a prompt and thorough examination. The first warning signs of cancer of the womb are—

(1) Any change in the duration and frequency of monthly periods ;
(2) Any change in the character of a discharge which has been usual with the patient ;
(3) Any return of bleeding after the change of life, that is, after regular periods have ceased ; and
(4) Watery, slightly stained discharges. These are particularly important.

It will be obvious from these considerations that cancer of the womb is a particularly insidious form of the disease.

External Cancer.—Cancer of the lip and tongue should be suspected when any sore on these parts does not heal and disappear. Cancer of the lip in its beginning often resembles the common sore due to cold, but of course persists, when a simple sore would rapidly clear up. This form of the disease is more common among men than among women. Cancer of the tongue has been frequently traced to constant irritation from sharp edges of decayed teeth, or badly fitting or broken dental plates. Smoking sometimes produces a chronic inflammation of the tongue and the formation of small fissures or ulcers. Any ulceration of the tongue not responding quickly to treatment should be considered cancerous until it is proved otherwise. Cancer of the skin frequently originates in benign lumps or ulcerations. Most warts and moles are unimportant, but those which change in size, shape, or appearance, or are subject to irritation, should be regarded with suspicion. Their removal may prevent cancer. In every such case, a doctor should at once be consulted.

Cancer of the Stomach, Intestines, and Rectum.—These are frequent and formidable types of the disease which are common to both sexes, and cause about 50 per cent. of all deaths from cancer. Nevertheless, cancer of the stomach and intestines can be successfully removed if the diagnosis is made early enough.

Cancer of the Stomach is very insidious in its onset, and, since such a cancer cannot be seen until it is exposed by operation, it is necessary at first to depend largely upon symptoms for a diagnosis. It is important to note, therefore, *that indigestion which does not yield soon to treatment in a person over 40 years of age, who has not had it before, especially if accompanied by loss of weight, is something that should at least lead to the suspicion of cancer, and indicates the need for a thorough medical examination with the aid of all modern methods of diagnosis.*

Cancer of the Intestine is commonly associated with constipation and colicky pains. The persistence of such symptoms should raise suspicions.

Cancer of the lower end of the Bowel is frequently mistaken for piles (hæmorrhoids) and treated as such. Blood in the stools is often due to this cause, but it may be an early symptom of cancer, and, therefore, demands examination.

Cancer Cures and Quacks.

There is no medicine that will cure cancer, and while drugs offered for this purpose may be harmless, they are worse than valueless, for their use causes the loss of vitally important time while the cancer develops beyond the operative stage. Any corrosive pastes are worse than useless. They not infrequently stimulate the cancer and make it grow more rapidly, or they may eat off the top and leave the bottom spreading deeper, all the while causing the loss of precious time.

Use of Radium and X-Rays.

Research in regard to cancer has continued to be actively prosecuted, and, while no results have yet been achieved of any practical moment as regards the cause of the disease, a notable advance has been made in preventing recurrence after operation and in the alleviation of certain inoperable cases by the application of X-rays and radium therapy. Surgical procedure still remains practically the only effective means of extirpating malignant growths, and the sooner it is resorted to the more easily can these growths be removed and the return of the disease prevented. It is of the utmost importance that persons suffering from indications of malignant disease should at once seek competent advice.

Summary.

These facts about cancer cannot be too often repeated, and should be known by every person over 30 years of age.

1. The vast majority of deaths from cancer occur at ages over 35 years, when one person in eight dies of cancer. At present nine cases out of ten are fatal, due largely to neglect and ignorance.
2. The chances of cure of cancer are greatly increased by its early recognition and immediate treatment.
3. Cancer is often preceded by certain simple troubles which, if treated, prevent the development of the disease.
4. Cancer at the beginning is almost always painless, and its onset for this reason is especially insidious and dangerous.
5. Cancer is at first a small local growth which can be safely and easily removed.
6. Every lump in the breast should be examined by a qualified doctor immediately on its discovery.
7. Persistent irregular discharge or bleeding from the womb is suspicious, and medical advice should be sought at once.
8. Sores, cracks, lacerations, lumps, and ulcers on any part of the body that do not disappear soon, and warts, moles, or birthmarks which change in size, colour, or appearance, may turn into cancer unless treated and cured.
9. The symptoms of cancer of the lower end of the bowel are regarded by many as due to such innocent causes as piles, and, therefore, neglected until the disease is far advanced.
10. Persistent indigestion, the occurrence of colicky pains or increasing constipation in people past middle life should arouse suspicion, and a doctor should be consulted immediately.

J. PARLANE KINLOCH,
Medical Officer of Health.

March, 1925.

It is within the knowledge of the Health Department that this cancer propagandism in Aberdeen has had the effect of inducing a comparatively large number of people with pre-cancerous conditions to seek medical advice and treatment.

It remains only to be said that the epidemiologist has always taken the view that cancer with its selective action is essentially an infectious disease. Such a view explains the statistical form of cancer. The foregoing survey of the fundamental knowledge of this disease merely lends support to the epidemiologist's early inference as to its infectious nature.

CHAPTER III.

DIABETES.

Recent writings by Maclean on the newer knowledge of diabetes and insulin therapy may thus be briefly summarised :—

Diabetes is due to deficiency of an active principle which is essential to normal carbohydrate metabolism, and which is contained in certain small islands of special cells found in the pancreas—the Islets of Langerhans. To Banting and Macleod belongs the credit of having prepared an extract of pancreas containing this active principle which is suitable for the treatment of diabetes. To this active substance these workers gave the name "Insulin." The isolation of insulin and its application to the treatment of serious cases of diabetes has opened up a fresh prospect of life and health to unfortunate sufferers from this disease. It may be mentioned in passing that this great achievement was dependent on improvement of methods for the accurate determination of small quantities of sugar in the blood, and that from start to finish, the discovery could not have been made without those experiments on living dogs which some people would seek to have abolished. Diabetes is nothing more than an interference with the mechanism which permits of the proper utilisation of food in the body, with the result that the diabetic subject becomes thin and ill. He presents the curious anomaly that the more food he eats the thinner and weaker he becomes, because his perverse metabolism is such that much of the food he is unable to use is changed into poisonous bodies which circulate in the blood and cause destruction of the body tissues, ending finally in death.

In normal metabolism the proteins of the food, such as the proteins of meat, fish, eggs and kindred bodies, are used as tissue formers, that part of the proteins which is not required for growth and repair of tissues being utilised for the production of work and heat. The carbohydrates of the food, such as sugar and starch, and the fats, are used simply as work and heat producers. In the process of digestion carbohydrates are broken down in the intestinal canal into the simple sugar known as glucose. The glucose is then absorbed into the blood, and normally the sugar content of the blood never rises above 0·18 per cent. By means of a special mechanism, any excess of sugar above this 0·18 per cent. is stored for future use in the liver and muscles in the form of a starch-like body known as glycogen. When the sugar is burnt up in the tissues to yield energy it forms carbon dioxide and water. Whenever the blood sugar rises above 0·18 per cent., the kidney begins to excrete sugar in the urine. Occasionally the kidney leaks and permits the escape of sugar in the urine when the concentration of sugar in the blood is much below this figure. This glycosuria has nothing to do with diabetes, and produces no ill effects. In the process of digestion fats are broken down to fatty acids and glycerin and are thus absorbed and stored as fat in the body. This fat is broken down to such ketone bodies as oxybutyric acid, diacetic acid, and acetone before being finally burnt up to carbon dioxide and water. In the process of digestion proteins are converted into the amino-acids of which they are composed. The nitrogenous portion of those amino-acids which are not required for the formation of tissue proteins is excreted mainly as urea, and the non-nitrogenous part is converted into sugar and ketone bodies before final oxidation to carbon dioxide and water.

All the food constituents are involved in the failure of the metabolic process in the diabetic subject. In diabetes, the liver loses the power of storing glycogen, and the tissues lose the power of oxidising sugar, with the result that sugar accumulates in the blood and is excreted in the urine. In diabetes the ketone bodies derived from the breaking down of the fatty acids cannot be oxidised, with the result that they also accumulate in the blood and are excreted in the urine. In diabetes also the sugar and ketone bodies formed by the oxidation of the amino-acids of the proteins similarly accumulate in the body and are excreted in the urine. These blood and urine changes are accompanied by weakness, emaciation, mental depression, thirst, hunger, and a tendency to the development of the grave diabetic coma which is the usual cause of death in the diabetic subject.

The administration of insulin in such cases has a really remarkable effect. From being a weak, depressed, emaciated wreck, the diabetic very soon becomes a strong, energetic individual. The sugar and ketone bodies disappear from his urine, and there is nothing to indicate that the patient has ever been the subject of diabetes. To secure this effect, however, the dosage of insulin must be carefully graduated and the limitations of the prescribed diet carefully observed. If given in excess, insulin may produce grave symptoms in both the normal and the diabetic individual. The chief of these symptoms are hot flushes, especially of the face, weakness of the limbs, giddiness, sweating, tremulousness, and ultimately, if the condition is not relieved, convulsions, coma, and death. It will be obvious, therefore, that the whole treatment must be carried out under adequate medical supervision. Naturally the injection of insulin under the skin two or three times a day causes some discomfort, but adult patients quickly learn to inject themselves quite satisfactorily.

The marvellous success of insulin in the treatment of severe and otherwise hopeless cases of diabetes is one of the most striking triumphs in the whole field of modern therapeutics.

Incidence of Diabetes in Aberdeen.

In the Report on Insulin, dated 26th November, 1923, by the Consultative Council on Medical and Allied Services, it is pointed out that with 500 deaths from diabetes registered in Scotland in 1921, it is reasonable to assume that there are at least 3,000 persons living in Scotland suffering from the disease. It is further estimated that, of these, 25 per cent., or, say, 750, require insulin treatment. Since the number of cases bears a fairly regular relation to the population, this estimate would indicate that there are about 100 cases in Aberdeen, 25 of which require insulin treatment. Having in view the terms of the Public Health (Scotland) Amendment Bill, which is at present before Parliament, and which, in the event of its being enacted, will empower Local Authorities to supply insulin free of charge or at a modified charge to certain diabetics of limited means, it was important to determine whether the Consultative Council's estimate of the prevalence of diabetes was applicable to Aberdeen. I accordingly communicated with the medical practitioners of the City with the object of measuring the incidence of the disease in Aberdeen. The following table indicates the number of cases of diabetes known to the medical practitioners of Aberdeen in March, 1924 :—

CASES OF DIABETES.

STATUS.	Total Cases.	Males.	Females.	Cases requiring Insulin.
Non-Insured—				
Well to do,	32	15	17	8
Limited means,	24	6	18	11
Insured,	18	16	2	7
Poor Law,	1	...	1	...
Totals,	75	37	38	26

This return, as obtained by courtesy of the medical practitioners, indicates that in March, 1924, there were 75 known cases of diabetes in the City, 26 of which required insulin treatment. A comparison of the figures obtained on the basis of the Consultative Council's estimate with the figures in the return of the medical practitioners shows that the estimate of the number of cases requiring insulin is found in practice to be astonishingly accurate, and the comparison suggests that a considerable number of cases of mild diabetes are not brought to the attention of medical practitioners. The return shows also that, because of their limited means, 11 diabetic patients would require assistance from the Town Council in obtaining supplies of insulin, the Burgh Insurance Committee having already made provision for the supply of insulin to insured persons. Taking 30 units of insulin per day as the average dose, and putting the price of insulin at 2s. per 100 units, then the cost of insulin per patient averages about £11 per year.

INSULIN TREATMENT OF DIABETES.

In terms of the Minutes of Council of 7th April, 1924, authority was given for insulin to be made available for the treatment of certain cases of diabetes occurring in expectant mothers, nursing mothers, and children under five years of age, and for certain necessitous cases of diabetes not coming under the Maternity Service and Child Welfare Scheme. During 1924, in consultation with the medical practitioners concerned, 11 cases of diabetes were thus supplied with insulin.

The experience gained in Aberdeen in 1924 indicates that diabetic patients receiving insulin treatment fail to benefit to anything like the full extent, owing to lack of adequate supervision and control. These patients fail to observe the rules prescribed by their physicians in regard both to diet and to the taking of insulin, with the result that they not infrequently develop one or other of the grave manifestations or complications of the disease. Provision of the necessary supervision would require the establishment of an organised diabetic clinic within the City. It may be argued that the number of persons who would receive benefit from such a clinic is too small to justify the additional expenditure that the organised clinic would incur, but in view of the fact that the necessary laboratory services have already been made available and that insulin is being supplied to patients of limited means, the additional expenditure would be insignificant in comparison with the advantages that adequate services imply.

CHAPTER IV.

METABOLISM AND DISEASE.

Dietetics has always been an important branch of preventive medicine. The services of the expert nutritionalist were not required to indicate to the epidemiologist the association of famine and pestilence, and in the absence of such services the epidemiologist could assess without bias the relative importance of environmental and physiological influences in permitting epidemics of disease. Thus, in investigating the effect of environmental contamination the epidemiologist has made available fundamental knowledge concerning water-borne diseases and insect-borne infections, and as an example of the effect of a restricted dietary scurvy has been known for centuries.

Following on the brilliant researches of Pasteur, it was natural and proper that attention should be directed to causal relationships between pathological phenomena and toxins produced by bacteria or evolved through disordered metabolism or introduced with the food, and to finding means of preventing their occurrence or counteracting their influence. At no time, however, has the epidemiologist lost sight of the importance of environmental and physiological influences in maintaining resistance to disease as is witnessed by the immediate appreciation of the value of the work of Flugge and his co-workers in determining the relation of the heat regulating mechanism of the body to the atmosphere, or of the more recent work of Leonard Hill in measuring the effect on the body of radiant energy. So also the importance of exercise and rest in maintaining health has long been appreciated. The importance of the influence of nutrition in the summation of influences which cause disease wherever it is induced by poverty and all that poverty implies, has been abundantly emphasised by a vast mass of statistical data relating to disease-rates and death-rates, but although Lavoisier more than a century ago had recognised that animal heat is derived from the oxidation of the body's substance it was futile to attempt to utilise the measurement of energy exchange and heat output in cases of disease so long as the fundamental features of metabolism in the healthy remained to be determined.

It has seemed necessary to make this point clear in view of the fact that coincident with the newer knowledge of nutrition which has been made available there has been a tendency among nutritionalists to suggest that epidemiologists have failed to recognise the fundamental importance of adequate nutrition. It was the failure of nutritionalists to devise methods for establishing normal values of energy transformations in the human body that alone delayed more comprehensive knowledge. The application of the biological method to the analysis of bacteria and their toxins has been intensive since the days of Pasteur; the intensive application of the biological method to the analysis of foodstuffs is only now being initiated in a science which was old before bacteriology was conceived.

BIOLOGICAL ANALYSIS OF FOODSTUFFS.

In the past, knowledge of nutrition progressed hand in hand with the science of chemistry, aided in so far as was permitted by nutritional investigations, such investigations being confined either to a general survey of the food requirements of a particular population or to the limited assistance that direct calorimetry with its complicated apparatus might provide. During the past few years, however, great advances have been made as a result of the intensive application of the biological method to the analysis of foodstuffs. In the biological tests, information of fundamental importance has been obtained by observing the effects of the experimental diets not only on the experimental animals themselves over a prolonged period of time but on their breeding power and on the progeny in succeeding generations.

INDIRECT CALORIMETRY.

The recent development of indirect calorimetry, also, with its simple apparatus has provided within limits, which will hereinafter be defined, means for the exact investigation of nutritional requirements of a wide description. The principle underlying indirect calorimetry is that by estimating the amount of O_2 taken in for the combustion of food, and by estimating the CO_2 given off when the combustion of the food has been carried to its end-point, it is possible to estimate the energy developed in the body by the food in question. The complete apparatus and method of calculation are as described by Cathcart. The clue to the nature of the combustion is the Respiratory Quotient—*i.e.*, the ratio of the output of CO_2 to the intake of O_2. Thus, with carbohydrates:—

$$C_6H_{12}O_6 + 6\ O_2 = 6\ CO_2 + 6\ H_2O$$

$$\therefore \text{R.Q. of CHO} = \frac{\text{Vol. } CO_2}{\text{Vol. } O_2} = \frac{6}{6} = 1$$

For fats the respiratory quotient is similarly calculated, *e.g.*—

$$2\ C_{51}H_{86} + 145\ O_2 = 102\ CO_2 + 86\ H_2O$$

$$\therefore \text{R.Q.} = \frac{102 \text{ Vols. } CO_2}{145 \text{ Vols. } O_2}$$

$$\therefore \text{R.Q. for Fats} = 0{\cdot}703$$

So also the R.Q. for proteins is found to be 0·801. The expired air is collected in a Douglas bag, and the analysis done by Haldane's apparatus. The oxygen figures and the Zuntz values are employed in calculating the results. Basal metabolism is ascertained, the food consumed, and again the energy output is determined. In this way it is possible to ascertain not only the actual energy value of the entire food, but of its fat and carbohydrate content, the energy value of the protein being determined indirectly by urinary analysis. In an analogous manner the physiological cost of muscular work may be determined. This crude description of the indirect method of calorimetry is given here, since not only has a short method of estimating energy output by means of CO_2 determinations alone been described, but apparatus for that purpose has been put on the market. Objections to the validity of the short method have been set forth by Orr and the writer elsewhere. In view of the necessity of putting the results of indirect calorimetry on an accurate basis, it is unfortunate that such inadequate methods should be used for clinical purposes and opinions formed on the results obtained.

Requisites of an Adequate Diet.

It has been well known for centuries that disease may arise as the direct result of dietary deficiencies, and extensive investigations of these diseased conditions have been made in recent years, the results of which investigations are best interpreted in the light of what constitutes a diet adequate for the promotion of growth and the preservation of health as determined by McCollum and his co-workers ("The Newer Knowledge of Nutrition," the Macmillan Publishing Company, 1920) as a result of their application of the biological method of investigation to the problem of the nutritional values of the proximate principles of food. Briefly stated, the adequate diet must contain (1) proteins containing in sufficient amount all the amino-acids required to form tissue proteins; (2) carbohydrate; (3) fat; (4) inorganic salts of a nature and amount sufficient to provide for growth and to maintain health; (5) an unidentified fat-soluble substance named fat-soluble A, abundant in butter fat, egg yolk fats, liver and kidney fats, but widely distributed in leaves, seeds, fruits, roots, and tubers, from whence animal life obtains it; (6) an unidentified substance soluble in water or alcohol named water soluble B, widely distributed in nature in seeds, leaves, fruit, roots, tubers, meats, eggs, and milk, and which is never associated with fats of vegetable or of animal origin. The last two essentials, fat-soluble A and water-soluble B, cannot be regarded as growth-producing substances alone; they are as essential for the maintenance of health as for the promotion of growth.

So-called Deficiency Diseases.

Xerophthalmia.—The presence in the diet of fat-soluble A prevents the development of a pathological condition in the eyes of the nature of a xerophthalmia. If xerophthalmia of dietary origin develops, administration of substances containing fat-solution A cures it rapidly.

Beri-beri.—The presence in the diet of water-soluble B prevents the development of beri-beri of dietary origin. If this polyneuritis develops, extracts containing water-soluble B cure it. While typical beri-beri has been repeatedly proved to be of dietary origin due to lack of water-soluble B, there is much epidemiological evidence that an acute infectious disease with all the classical symptoms of beri-beri may develop in people whose diet has been entirely adequate.

Scurvy.—In view of the basic requirements of a diet adequate for the promotion of growth and the maintenance of health having been defined, the accuracy of the conclusion that scurvy is due to the absence from the diet of an unidentified food substance (a so-called accessory food substance or vitamine, vitamine C) has been called in question, and it has been suggested that scurvy may be proved to be a disease due to bacteria or their toxins invading the body from the cæcum following on a condition of stasis in the cæcum due to an unbalanced diet.

Pellagra.—So also with pellagra, the weight of evidence indicates that while poor nutrition predisposes to the infection there is an infectious agent involved in the production of the disease.

Rickets.—With rickets also, every one is agreed that this is a nutritional disease, and recent researches have shown that the diseased calcification of the growing bones results from (*a*) a diet deficient in antirachitic substance and (*b*) lack of ultra-violet rays. If young rats are put on a diet deficient in antirachitic substances and having a minimum of salts of phosphorus, the phosphorus is not absorbed from the gut. Either the addition of antirachitic substance in cod liver oil or ultra-violet radiation for a few minutes a day will wholly stop rickets developing and cause a minimal amount of phosphorus in the diet to be absorbed and utilised in bone building.

It has been proved that the antirachitic substance present in cod liver oil is not a vitamine A and that it can be put into an inactive food by ultra-violet radiation. Thus, inactive linseed oil, casein, flour, and lettuce leaves can be made as effective as cod liver oil in preventing rickets, by rotating them in a quartz flask in front of the mercury vapour lamp. Water, fat, starch, sugar, mineral oil, and glycerin cannot be so activated. Oils retain their acquired antirachitic power for months. Radiated cholesterol makes an extremely active antirachitic substance, and possibly in all food stuffs shown to be activated by radiation this is the activated body. Possibly radiated rats absorb this from the skin. The compounds in plants capable of being activated and so corresponding to the cholesterol in animal tissues are probably the phytosterols. It has been claimed that the "active" food substance in cod liver oil on oxidation gives off ultra-violet rays, but Webster has shown that this is not so, the error being due to the fluorescence of certain quartz screens used in the photographic tests. There is no evidence so far that radiation can endow an inactive food with the growth qualities pertaining to vitamine A, and, accordingly, in this respect margarine continues to be inferior to butter. The finding of Mellanby that the substance in oatmeal which interferes with the laying down of calcium in the bones is associated with the fatty acids of the cereal has also to be noted. There is now abundant clinical experience to show that light therapy is one of the most powerful remedies available for the treatment of rickets. Rickets can be cured by making the diet more adequate, *e.g.*, by cod liver oil, and by exposing the patient's body to sunlight or by the use of artificial sun baths.

At a time when there is much experimental evidence to justify the removal of rickets from the category of diseases due to bacterial invasion of the body and to group it with the increasing number of so-called deficiency disorders, it is interesting to note that the earlier view of epidemiologists as to an infective agent in the disease as suggested by its known distribution and seasonal incidence is now receiving support from a certain section of nutritionalists.

Mineral Metabolism and Disease.

More simple and direct are the relationships between clinical phenomena and disordered mineral metabolism. Thus there is miner's cramp due to a decrease of the concentration of the salts in the blood consequent upon drinking the large quantity of water necessary to restore the loss of water due to excessive sweating. There is simple goitre, which can be prevented by the administration of iodine. There are the more complicated relationships of the individual mineral elements to each other in the body fluids and the influence upon them of environmental factors such as sunshine and exercise (the recent results of Orr and his co-workers in relation to the influence of irradiation on the calcium and phosphorus retention in growing pigs is noted). Veterinary medicine provides a mass of evidence relating to the pathological phenomena which are associated with various dietary deficiencies.

Metabolism and Epidemic Disease.

It is in regard to the known infective processes that information concerning the influence of nutrition from the epidemiological standpoint is most desired, and in this connection knowledge is much more uncertain. Thus, with reference to tuberculosis, inferences as to the nutritional element are abundant, but without confirmation. For instance, Hamill states (Ministry of Health Reports on Public Health and Medical Subjects, No. 9, 1921) that "the incidence of tuberculosis in a community appears to be closely correlated with the food supply; the incidence of the disease diminishes when the food supply is ample and suitable, and increases when for one reason or another food is difficult to obtain, and the quantity and quality of the diet become inadequate." So also M'Collum states, without convincing argument, that "an examination of any large group of people in the cities will show that where there is a high mortality from tuberculosis, milk is not being used to any great extent, and in any large group where milk purchases are large the disease is not a menace." In Germany at the end of the war the death-rate from tuberculosis had doubled. Observations of such a description are invalid in the absence of accurate experimental data. Most workers who have conducted extensive feeding experiments with laboratory animals have noted the greatly increased susceptibility to pneumonia and other respiratory diseases in animals on ill-balanced diets.

Almost nothing is known of the direct effects of microbic infection on metabolism. Probably definite alterations in metabolism are brought about by the interaction of the products of microbic activity with tissue ferments. Indirectly, however, microbic infection commonly brings about metabolic changes which are of importance in understanding disease conditions. Qualitative or quantitative alterations in food intake, alterations of oxygen supply, local destructive processes, and changes in functional activity and in excretion and carbon dioxide elimination are some of the metabolic disturbances that may follow infection.

Therapeutic Applications of Calorimetry.

The diseases in which gross variations from normal metabolism have been discovered are those of the thyroid gland, the fevers, and certain diseases of the hæmatopoietic system. M'Cann has pointed out that in these conditions which produce marked abnormalities of the basal metabolism, its determination for diagnostic purposes is usually superfluous, although it remains of value as a measure of the severity of hyperthyroidism or hypothyroidism, and is thus useful as an index of the effectiveness of treatment of these two conditions. M'Cann makes it clear, however, that minor variations from the average normal metabolism occur in such a wide variety of pathological conditions that a searching clinical analysis is necessary for the evaluation of the metabolism test. Not only so, but there must be careful control of environmental and nutritional conditions and avoidance of emotional reactions if reliable results are to be obtained. Taking all these things into consideration, M'Cann concludes that the diagnostic value of basal metabolism tests is very slight.

Nevertheless, calorimetry has provided a clearer conception of the heat regulation in fever and of the food requirements in many illnesses. The interrelationships of the energy transformations, with the functional demands on the heart and lungs, are important considerations in regulation of the diet and exercise in such a disease as pulmonary tuberculosis. A knowledge of these relationships will find important therapeutic applications in many diseases. Sufficient experience has been gained by the Health Department in estimating basal metabolism at various ages and in both sexes to make it clear that if reliable results are to be obtained, the metabolic estimations must be in the hands of a physiologist trained in the methods of indirect calorimetry.

In view of the results that have already been achieved and that are definitely promised for the future by the application of the methods of nutritional science to the dieting of the sick and the well, it is hoped that the contemplated development of the nutritional laboratory at the City Hospital, which was initiated by the appointment of a biochemist two years ago, may not be unduly delayed.

CHAPTER V.

ENVIRONMENTAL CONDITIONS.

The malign influence of environmental pollutions on the health of the people has long been recognised, and while the problem is as old as humanity itself it was enormously complicated by the intensive urbanisation of the population of the country which took place during the past century. Information concerning the population is contained in the first census of the United Kingdom which was taken in 1801, when the nation was in the midst of its deadly struggle with France. Since then the population of Scotland has increased about 200 per cent. and the population of England has increased about 250 per cent. This increase in population has not been equally distributed. Every census shows that there has been a continual movement of the people from the conditions of rural or village life to those of urban life. In 1801, London contained 11 per cent. of the inhabitants of England; it now contains about 20 per cent. In 1801, Glasgow contained barely 5 per cent. of the inhabitants of Scotland; it now contains over 21 per cent.; and the same thing has been happening in relation to all large towns. As a matter of fact, about 75 per cent. of the population of Great Britain are living under urban conditions at the present time.

In the mere process of living, man and all animals necessarily pollute the air, earth, and water; the physico-chemical processes of which life consists cannot go on without that pollution; and just as constantly the purifying processes of the vegetable world are eliminating that pollution in their fermentative, putrefactive, and assimilative processes. In his nomadic days, man's pollution of the environment went on as it does to-day, but he left that pollution behind him as he wandered abroad, and the purifying processes of nature did the rest. But when man settled down, there came the conditions that permitted the present advance in civilisation, and with it a localised intensification of pollution with which the purifying processes of nature without direction could no longer cope. Accordingly, methods had to be devised for dealing with the environmental pollution of a stationary isolated individual or group of individuals, and when that was necessary for the isolated individual it is possible to get some idea of the terrific poisoning of the environment which necessarily accompanied the intensive urbanisation of the past century.

The abatement of much of that gross environmental pollution of earlier days is already old history, and with it came the conquest of a great mass of disease dependent on it. Thus, when the cultivation and drainage of the land prevented the breeding of the anopheline mosquito, when houses ceased to be overrun with rats, and when increasing personal cleanliness prevented general infestation of the populace with lice and fleas, so the great insect-borne diseases—malaria, plague, typhus, and relapsing fever—were brought under control. So also, when efficient systems of drainage and sewerage prevented the pollution of water, and pure water supplies were made generally available, the great water-borne diseases—cholera, bacillary dysentery, and typhoid fever—were brought under control. More recently, the causes of the ill effects of pollution of the air have been ascertained, and it is now common knowledge that it is the moist, stagnant condition of vitiated air that is harmful rather than the presence in it of noxious gases or bacteria. Man's pollution of the air is rapidly diluted and dissipated out-of-doors by wind and thermal conduction and diffusion, but in the closed-in air of the badly ventilated house the warm, moist, stagnant air interferes with the heat regulating mechanism of the body, and, together with the absence of sunlight and other forms of radiant energy, is the most potent environmental influence at present producing that lowering of the resistance of the body which permits the onset of disease. The enormous importance of fresh air and sunlight in maintaining health and increasing resistance to disease can scarcely be exaggerated as is made evident in the full discussion of the matter in the section of this Report dealing with the Tuberculosis Services. These considerations of environmental hygiene make it easy now to understand how in the ill-ventilated, ill-lighted warrens of the poor of earlier times, the ill-fed populace were a fit and fruitful medium for the dissemination of insect-borne, water-borne, and spray-borne infections.

With the bringing of the environment under control, there followed the recognition that man himself was the chief reservoir from which infection flowed, and that epidemics of disease would continue to defy environmental sanitation so long as infectious persons and susceptible individuals exist. This led to the development of the idea of communal responsibility for the welfare of the individual and to the development of new methods of protection from disease, resulting in the modern health services with their immunising and hospital facilities.

ATMOSPHERIC CONDITIONS.

Weather and Disease.—In Table VII. is summarised the state of the weather in Aberdeen for each month throughout the year under review, along with the average for the twenty-five years 1897-1921.

As regards sunshine, the months which enjoyed the most sunshine were June and September, with 151 and 150 hours respectively, or five hours a day; while the months with the least sunshine were January and November, with 32 hours during each of these months, or one hour a day. The total amount of sunshine for the year under review was considerably below the average for the years 1897-1921.

March was the coldest month, with a temperature of 37·2° F., the warmest month being July, with a temperature of 56·8°. The difference in temperature between the coldest and warmest months was 19·6, which was above the average for the years 1897-1921 (17·5°). The mean temperature for the whole year was 46·6°, the average for preceding years being 47·2°. The mean daily range of

Table VII.—Aberdeen.—Meteorological Record for Each Month (From King's College Observatory).

MONTH.	BAROMETRIC PRESSURE (at 32° F. and Sea Level).			TEMPERATURE OF ATMOSPHERE.				Mean Daily Temp. of Ground (4 feet below surface)	Relative Humidity. Sat. = 100.	RAIN-FALL		SUNSHINE.		* WIND. Direction; and Duration in Hours.									Velocity
	Absolute Highest	Absolute Lowest.	Mean Daily Range.	Absolute Highest	Absolute Lowest.	Mean Daily Temp.	Mean Daily Range.			Duration.	Amount	Duration.	Percentage of possible Sunshine.	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm	Average No. miles per day.
YEAR 1924.																							
	Inches.	Inches.	Inches.							Hours.	Inches.	Hours.											
January, . .	30·420	29·112	0·23	53·1	23·7	39·6	7·9	39·5	85	102	2·1	32	14	...	4	21	**111**	**233**	**196**	**113**	53	13	283
February, .	30·570	28·560	0·27	52·0	27·1	39·6	7·3	40·2	78	121	1·5	48	18	92	7	2	**102**	60	97	**176**	**153**	7	345
March, . .	30·412	28·622	0·17	51·8	21·9	37·2	8·6	39·5	78	73	1·1	103	28	44	52	30	56	**143**	95	**150**	**165**	9	253
April, . .	30·443	29·195	0·18	64·2	31·1	42·6	10·5	41·6	77	75	1·7	144	34	39	27	77	92	**117**	87	**147**	**131**	3	238
May, . .	30·172	29·363	0·16	62·6	31·6	46·4	9·0	45·0	85	159	4·9	118	23	79	55	97	**133**	**183**	64	42	66	25	224
June, . .	30·275	29·422	0·16	66·6	37·0	51·9	11·4	48·8	80	83	1·8	151	28	83	50	43	93	**147**	74	61	**112**	57	214
July, . .	30·126	29·111	0·18	73·6	47·7	56·8	10·9	52·5	81	142	5·3	135	26	29	26	50	**101**	**180**	**111**	**107**	98	42	193
August, .	30·344	29·152	0·17	69·1	43·2	56·1	9·4	53·9	82	103	2·3	122	26	29	17	29	42	**267**	**112**	**102**	**126**	20	201
September, .	30·447	29·069	0·31	63·0	36·9	51·8	11·4	53·1	83	102	4·4	150	39	38	41	51	21	**139**	**153**	**125**	**117**	35	221
October, . .	30·454	29·071	0·23	57·2	32·2	47·9	8·8	50·2	85	116	3·0	88	27	28	11	17	35	**235**	**152**	**130**	**106**	30	216
November, .	30·605	29·043	0·24	53·8	33·6	45·6	6·1	47·0	86	128	2·6	32	14	5	...	9	96	**192**	**162**	**134**	**103**	19	241
December, .	30·315	28·488	0·29	53·8	30·9	44·2	7·5	45·4	85	100	3·2	33	16	...	11	25	51	**280**	**291**	68	15	3	279
Monthly Average	30·382	29·017	0·22	60·1	33·1	46·6	9·1	46·4	82	109	2·8	96	24	39	25	38	78	**181**	**133**	**113**	**104**	22	242
Total for Year, .	...	...	...	...	...	...	...	...	...	1304	33·9	1156	...	466	301	451	933	2176	1594	1355	1245	263	...
AVERAGE FOR TWENTY-FIVE YEARS, 1897-1921.																							
January, .	30·54	28·81	0·31	52·0	26·1	38·7	7·7	40·4	80	86	2·1	43	19	23	10	21	85	**165**	**202**	**144**	94	0·1	242
February, .	30·49	28·85	0·28	52·0	24·8	38·9	8·3	39·6	80	76	1·8	73	28	24	17	25	65	**171**	**148**	**126**	**101**	...	229
March, .	30·35	28·88	0·26	55·1	26·7	40·1	9·1	40·1	78	103	2·3	109	30	47	31	47	95	**142**	**137**	**120**	**124**	0·2	239
April, . .	30·47	29·04	0·23	60·1	30·3	43·3	10·2	42·2	78	84	2·0	157	38	50	45	51	96	**147**	96	**110**	**126**	0·1	217
May, . .	30·44	29·24	0·19	66·7	34·7	48·0	11·1	45·8	78	83	2·4	183	37	74	57	84	**134**	**149**	73	69	**104**	0·9	189
June, . .	30·38	29·42	0·16	69·9	39·3	52·9	11·3	50·4	77	64	1·7	183	35	73	59	79	**111**	**131**	74	67	**133**	0·4	181
July, . .	30·34	29·40	0·16	72·6	43·2	56·2	10·9	53·2	78	75	2·8	154	29	65	49	82	**107**	**133**	80	83	**144**	1·9	163
August, . .	30·29	29·31	0·17	71·6	42·4	55·6	10·7	54·3	80	76	2·6	141	31	48	47	67	**103**	**151**	**100**	96	**133**	1·3	164
September, .	30·42	29·22	0·20	67·8	38·4	53·0	11·0	53·0	80	72	2·1	125	33	36	24	39	87	**173**	**119**	**114**	**129**	0·5	181
October, . .	30·44	29·06	0·24	61·3	32·9	47·9	9·3	50·3	82	101	2·8	91	29	34	22	38	**104**	**195**	**128**	**108**	75	0·3	211
November, .	30·46	28·84	0·26	55·5	27·1	42·5	8·2	46·3	82	102	2·8	55	23	26	9	24	69	**164**	**164**	**155**	**107**	0·1	228
December, .	30·40	28·75	0·30	52·7	24·8	39·6	7·8	42·7	82	115	3·3	36	18	20	8	26	76	**173**	**198**	**155**	92	0·1	234
Monthly Average	30·42	29·07	0·23	61·4	32·6	47·2	9·6	46·5	80	86	2·4	113	29	43	32	49	94	**158**	**127**	**112**	**114**	0·5	207
Total for Year, .	...	...	...	...	...	...	...	...	...	1037	28·7	1350	...	520	378	583	1132	1894	1519	1347	1362	5·9	...

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* To indicate the dominant direction, every duration of 100 hours and upwards is in thick figures.

temperature, or the difference between the highest and lowest for the day, averaged 9·1 in 1924. The daily range was greatest on the average from April to September, with monthly means of 9·0° to 11·4°, and least in November, with 6·1°.

During 1924, the driest month was March, with 1·1 inches of rainfall, while July was the wettest, with almost five times that amount of rain. The total amount of rainfall during the year is in excess of the average for preceding years.

As in previous years, the most prevalent winds in Aberdeen were from the south and south-west, the least prevalent being easterly and northerly winds.

The importance of fresh air and sunlight in maintaining health and increasing resistance to disease has already been emphasised, but statistical evidence of this benefit is not readily procured. The relationship between atmospheric conditions on the one hand and diseases such as pneumonia and bronchitis on the other hand would appear to be obvious to the extent that deaths from both these diseases are distinctly more numerous in the winter months of the year under conditions of exposure to cold and damp and fog than in the summer months—this being especially true of bronchitis. So also the relationship of summer diarrhœa to climatic conditions is obvious to the extent that a certain temperature has been found to be necessary to permit the infection to attain epidemic proportions. Again, some relationship between climatic conditions and the prevalence of infectious diseases in general is discernible in the seasonal changes of zymotics. So far, however, the endeavour to trace a definite relationship between meteorological conditions and the epidemic prevalence of zymotic diseases has been largely unsuccessful. The organisms that permit epidemics of disease are little animals and plants that obey the same biological law of increase and decrease that governs all other living organisms. Probably the conditions that finally determine the period of growth or multiplication and the period of rest in all living organisms have their essential origin in meteorological variations, but the fact remains that the most careful scrutiny of meteorological variations and variations in zymotic prevalence ever since the measurement of such variations was available, has failed to reveal any significant relationship between them.

SMOKE ABATEMENT.—During 1924, a considerable improvement has been made in preventing the emission of black smoke from factory chimneys. In general, smoke abatement in so far as factories and workshops are concerned can be secured by the use of suitable fuel and the adoption of proper methods of stoking, including in some cases the introduction of mechanical stokers, provided that the boiler plant is not overtaxed; but in certain works the strain on the boilers is such that the introduction of special smoke consuming apparatus has been found the best practicable means of obviating smoke nuisance. Recent experience of the functioning of modern smoke consuming plant in Aberdeen indicates that if an adequate apparatus is installed and properly supervised and worked, smoke nuisance can be eliminated. The main drawback in connection with the general application of smoke consuming devices to works is the financial cost of installing such plant; but it is anticipated that there will be a continual increase in the installation of such apparatus as time progresses and as trade improves.

HOUSING CONDITIONS.

A comprehensive review of the housing situation in Aberdeen is given in the preceding Annual Report of the Medical Officer of Health together with a statement of the action taken by the Town Council in endeavouring to provide additional houses for the working classes and to clear slum areas.

Housing of the Working Classes.—Some improvement in the deadlock in the provision of additional houses under the 1919 Act that had arisen as a result of the excessive cost of house building in Aberdeen has now to be recorded. In terms of the Minutes of Council of 7th July, 1924, provision was made for the erection of 20 additional dwellings on the Torry site under the 1923 Housing Act. In terms of the Minutes of Council of 15th June, 1925, the 48 two-apartment houses in course of erection at Cattofield under the Town Council's Slum Clearance Scheme were transferred to the 1923 Act, and will accordingly provide additional housing accommodation instead of being utilised for providing alternative accommodation under the Slum Clearance Scheme. In terms of the same Minutes of Council provision has been made for the erection of 300 dwelling-houses of three apartments, with scullery, bathroom, coal cellar, &c., on the estate of Hilton, under the powers contained in the Housing (Financial Provisions) Act, 1924. This last development would appear to end the former housing impasse, an achievement the greatness of which can only properly be realised by those who are fully informed as to the desperate sanitary need of additional houses.

Scheme of Slum Improvement.—In terms of the Minutes of Council of 2nd September, 1924, and 19th January, 1925, the Town Council, having taken into consideration the Official Representation of the Medical Officer of Health in regard to the Guestrow, Shuttle Lane, and Shoe Lane areas, resolved to proceed with an Improvement Scheme, adjusted its terms, and authorised its requisite publication and the serving of notices.

The vital statistics of the slum areas are as follows:—

Aberdeen.—Clearance of Slum Areas—Vital Statistics.

Vital Statistics (5 years average, 1919-1923).	Whole City.	Greyfriars Ward.	Guestrow Area.	Shoe Lane Area.	Shuttle Lane Area.
Death-Rate—					
All Causes, per 1,000, . . .	14·8	20·4	23·0	23·3	23·7
Respiratory Diseases, per 1,000, .	2·2	3·6	3·0	4·7	5·4
Phthisis, per 1,000, ...	0·9	1·7	2·4	1·2	1·4
Infantile Mortality, per 1,000 Births, .	117	154	178	154	246

Overcrowding.—A measure of the extent of overcrowding in the poorer houses of the City is given in the report of the Sanitary Inspector. Overcrowding was not permitted prior to 1917, but since then the number of houses in which it could not be suppressed owing to the want of alternative accommodation has steadily increased, and during the past eight years the Health Department has been unable to obtain abatement of overcrowding in a total of 550 houses wherein the excess of inmates has varied from one to five adults per house.

TOWN PLANNING.

I again take leave to call the attention of the Town Council to the desirability of appointing at the present time a Town Planning Committee which will be charged with the preparation of a Town Planning Scheme. As I endeavoured to make clear in my previous Report, the magnitude and complexity of the issues involved in the preparation of a Town Planning Scheme for Aberdeen are such as to tax to the utmost every service necessary to the science and art of town planning. In terms of the 1923 Housing Act, a Town Planning Scheme is called for by 1929, and it is important that the Committee designed to formulate the Scheme should get to work immediately, if a satisfactory Scheme is to be evolved by that date.

FACTORIES, WORKSHOPS, AND WORKPLACES.

Factories.—The Factories Bill, 1924, which had been introduced into Parliament during the year, was remitted by the Town Council to the consideration of the Public Health Committee for a report. In view of the fact that the Scottish Board of Health Act, 1919, had contemplated the unification of the central public medical services, the Medical Officer of Health submitted to the Public Health Committee a memorandum in which it was stated:—

> "In the Factories Bill, 1924, at present before Parliament, it is intended that the entire control of health and sanitation, both in factories and in workshops, should be put under the Home Office. This appears to be a retrograde proposal, and would further negative the Board of Health Act, which was expected to produce a unification of health work. In spite of that Act, there still remains in active existence three central health departments, namely, the Board of Health (which has most of the general work), the Board of Education, which has never relaxed its grip upon the health work in connection with children of school age, and the Home Office, which still has entire supervision of health in factories. At present the sanitation of workshops, as distinguished from factories, is in the hands of the local sanitary authority; but the new Factories Bill would put the sanitation of both factories and workshops under the Home Office.
>
> "The view is taken that, in the interests of efficiency and economy, the whole subject of health in factories and workshops should be transferred to the larger health authorities of the country. It is accordingly suggested that the Public Health Committee should recommend the Town Council to protest to the Board of Health and the Secretary for Scotland against the provisions of the Factories Bill, 1924."

In terms of the Minutes of Council of 18th August, 1924, the Council adopted the following resolutions in regard to the Bill, viz.:—

"(1) That the Town Council of Aberdeen desires to record its strong protest against the proposal that the powers regarding the sanitary condition of workshops should be taken out of the hands of the local Sanitary Authority, as proposed in the Factories

Bill now before Parliament, and that the Council is of opinion that the enforcement of all the sanitary provisions relating to factories, at present a function of the Home Office, should be transferred to the local Sanitary Authority.

"(2) That copies of the resolution should be transmitted to the Secretary for Scotland and also to the Scottish Board of Health."

In regard to this action of the Town Council, it seems desirable to state clearly that the Council are fully aware of the value of the expert services provided in relation to factory sanitation by the executive officers of the Factory Department of the Home Office. It is also desirable to make it clear that the health officials of the Town Council welcome the advice and guidance on matters of factory hygiene which the experts of the Home Office can provide. In this connection, it is hardly necessary to reaffirm the accepted view that the great advances in knowledge concerning hygiene and the increasing scope of public health work are such as to require the creation of many divisions of hygiene, and that the problems and practices connected with each of these have become so highly technical as to require the services of specialists to secure the full development of the different departments. As a matter of fact, the advantage of having the services of an expert in industrial hygiene made available to the fullest extent in Aberdeen was so apparent that on my recommendation the University Court appointed Dr. E. L. Middleton, H.M. Inspector of Factories in Scotland, Lecturer in Factory Hygiene in Aberdeen University in December, 1923. This appointment is the first of its kind in Scotland and has undoubtedly increased the value of the instruction given in industrial hygiene to students for the Diploma in Public Health.

It must be apparent to every one, however, that there is nothing in the principles of industrial hygiene essentially different or detached from the fundamental principles of preventive medicine in general, and it must be obvious that every argument which has been urged as to the desirability of unifying other public medical services which at present function separately and incur unnecessary administrative expenditure and overlapping of health effort, applies equally to the desirability of incorporating the medical department of the Home Office in the unified public medical service which the whole trend of instructed public opinion and policy is at present seeking to make real. The former opposition of owners of factories to local sanitary control no longer exists. Affiliation of the Medical Department of the Home Office with the Medical Department of the Board of Health being once secured, there would be no doubt of the benefit that would accrue to the community, if the local health services for factories were made homologous with the health services for the City generally. The present absurd anomaly by which matters relating to the health of children and young persons are in turn the concern of the City Health Department, of the Medical Department of the Education Authority, and of the Factory Department of the Home Office, should no longer be indulgently accepted.

Table VIII. is submitted, giving details of the administration of the Factory and Workshop Act, 1901. No prosecutions had to be instituted under the Act, but a large number of defects discovered during the routine inspections, were remedied.

TABLE VIII.—ABERDEEN.—FACTORIES, WORKSHOPS, AND WORKPLACES, 1924.

1.—INSPECTION OF FACTORIES, WORKSHOPS, AND WORKPLACES.

Including Inspections made by Sanitary Inspectors.

Premises.	NUMBER OF		
	Inspections.	Written Notices.	Prosecutions.
Factories (including Factory Laundries) . .	1,510	361	0
Workshops (including Workshop Laundries) .	1,931	295	0
Workplaces (other than Outworkers' premises) .	55	12	0
TOTAL	3,496	668	0

2.—DEFECTS FOUND IN FACTORIES, WORKSHOPS, AND WORKPLACES.

Particulars.	NUMBER OF DEFECTS			Number of Prosecutions.
	Found.	Remedied.	Referred to H.M. Inspector.	
NUISANCES UNDER THE PUBLIC HEALTH ACTS.*				
Want of cleanliness	544	537	0	0
Want of ventilation	19	18	0	0
Overcrowding	1	1	0	0
Want of drainage of floors	0	0	0	0
Other nuisances	112	103	0	0
Sanitary accommodation { Insufficient . . .	3	2	0	0
Sanitary accommodation { Unsuitable or defective	34	28	1	0
Sanitary accommodation { Not separate for sexes	0	0	0	0
OFFENCES UNDER THE FACTORY AND WORKSHOP ACTS.				
Illegal occupation of underground bakehouse (s. 101)	0	0	0	0
Other offences . . . . (Excluding offences relating to outwork and offences under the Sections mentioned in the Schedule to the Scottish Board of Health (Factories and Workshops Transfer of Powers) Order, 1921.)	0	0	0	0
TOTAL	713	689	1	0

* Including those specified in Sections 2, 3, 7, and 8 of the Factory and Workshop Act, 1901, as remediable under the Public Health Acts.

WORKSHOPS.—The number of workshops, exclusive of bakehouses, registered at the end of 1924 was 765, as compared with 763 in 1923.

Excellent work continues to be done by the Sanitary Inspector and his staff in the sanitary control of the workshops of the City. Every workshop is inspected at least once a year, and an effort is made to keep it in accordance with the requirements of the Public Health Act and the Factory and Workshop Acts. Fishcuring and provision-curing works are inspected very frequently, some of them almost daily, the primary object of the visit being the inspection of the food. The bulk of the defects found during the years under review had reference to want of cleanliness.

The Health Department is alive to the requirement of Section 61 of the Factory and Workshop Act, 1901, whereby it is enacted that no woman or girl shall be employed within a factory or workshop within four weeks after she has given birth to a child. So far as can be ascertained through the Health Visitors, there is no evidence that women are so employed in Aberdeen.

Bakehouses.—The bakehouses, of which there were 79 in the City in 1924, as compared with 80 in 1923, were, as usual, inspected every quarter or oftener, and were found, on the whole, to be in a satisfactory condition. Certain sanitary defects in connection with bakehouses were remedied at the suggestion of the Health Department.

Home Workers.—With regard to home workers, the usual routine inspections were made in connection with the sanitary condition of the premises and the prevention of infectious diseases.

Inspection of Plans.—During the year under review, plans of nine premises, chiefly alterations and additions to existing buildings, were examined and reported on by the Medical Officer of Health and Sanitary Inspector. Certain recommendations in regard to the sanitary requirements of the premises were given effect to prior to the approval of the plans by the Town Council.

OFFENSIVE TRADES.

The offensive trades in Aberdeen, within the meaning of the Public Health Act, are concerned chiefly with tallow-melting or oil extracting from ox bones or fish livers, soap boiling, slaughtering, knackering, hide factoring, and the manufacture of manures and fish meal.

No new applications for the establishment of offensive trades were sanctioned during the year.

All the premises in which offensive trades are carried on are kept under regular supervision by the Sanitary Inspector and his staff. Representation was made to the Town Council by the Medical Officer of Health and Sanitary Inspector relating to offensive effluvia emanating from premises situated in the centre of the City where the business of gut cleaning, tallow melting, and bone boiling had for long been in operation. The intermittent nuisance in these premises had been a justifiable cause of complaint by the citizens of Aberdeen for many years. As a result of the representation by the officials, the Town Council resolved that in the event of a recurrence of the nuisance legal proceedings should be instituted against the firm for the abatement of the nuisance. As a result of this action by the Town Council, the firm undertook to discontinue the part of their business which was the chief source of nuisance, and proceeded to obtain the sanction of the Aberdeen District Committee to transfer the offensive part of their business to a site remote from dwelling-houses. So far, this transference has not taken place.

DRAINAGE.

A detailed survey of all sources of pollution of streams in the City of Aberdeen, distinguishing the various kinds of pollution, *e.g.*, from trade effluents and from

TYPICAL BACILLUS COLI.

Year.	Samples from.	Absent in 100 c.c. per cent.	Present in 100 c.c. per cent.	Present in 50 c.c. per cent.	Present in 20 c.c. per cent.	Present in 10 c.c. per cent.	Present in 5 c.c. per cent.	Present in 1 c.c. & less per cent.	Remarks.
1924	River Water . . .	...	...	...	...	...	55	45	The water was limed for a total period of 74 days when the river was in a disturbed state after floods, during times of high consumpt of water when the filters were inadequate to deal with the quantity of water required, and when resanding of filters was being carried out.
	Invercannie Filter Outlet	32	18	30	20	...	...	...	
	Aberdeen Tap Water .	18	12	35	35	...	...	...	
1923	River Water . . .	...	...	2	...	14	61	23	The water was limed for a total period of 115 days when the river was in a disturbed state after floods, during times of high consumpt of water when the filters were inadequate to deal with the quantity of water required, and when resanding of filters was being carried out.
	Invercannie Filter Outlet	57	20	21	2	...	...	...	
	Aberdeen Tap Water .	47	30	21	2	...	...	...	
1922	River Water . . .	...	6	8	21	27	23	15	The water was limed for a total period of 47 days during times of high consumpt of water when the filters were inadequate to deal with the quantity of water required, and when resanding of filters was carried out.
	Invercannie Filter Outlet	58	27	12	3	...	...	...	
	Aberdeen Tap Water .	50	37	10	3	...	...	...	
Aberdeen Tap Water, 1907, . (*i.e.*, before the Water was filtered.)		...	...	13	...	29	33	25	

sewage, and a complete survey of the methods of sewage disposal, was submitted to the Scottish Board of Health in the return on Rivers Pollution Prevention, and is fully set forth in the preceding Annual Report of the Medical Officer of Health.

The duplication of the aqueduct from Victoria Bridge to the Bay of Nigg was completed in October, 1924.

WATER SUPPLY.

The progress made during 1924 with the construction of the new works under the 1916 Corporation Water Act is recorded in the reports of the Water Engineer. As a result of the continued interference with the water supply which progress in the construction of the new works necessarily entails, the quality of the water as determined by bacteriological examination is less satisfactory than it was during the years 1916-21, when a remarkable improvement in the Aberdeen tap water was obtained following on the temporary purification works being instituted.

The instructive table on page 81, measuring in percentages the degree of purity of the water in terms of bacillus coli, provides evidence of the present state of the water as compared with the two previous years. The table shows that during 1924 Aberdeen tap water at no time contained bacillus coli in less than 20 c.c.s. of water, but that in 35 per cent. of the examinations bacillus coli was present in 20 c.c.s.

CHAPTER VI.

SPECIAL HEALTH SERVICES.

JOINT HOSPITAL SCHEME.

It is common knowledge that there is urgent need for additional institutional accommodation by the majority of the voluntary and statutory health services of the City, and that the occasion has been regarded as opportune for the consideration of the provision of a common hospital site of such extent as to provide eventually for the whole hospital system of the City.

The scheme for such a common hospital in Aberdeen was originally conceived by Professor Matthew Hay and promulgated by Professor Ashley Mackintosh as far back as 1920, and since then has been submitted to the most careful scrutiny by the Joint Hospitals Executive Committee, representative of the University Court, the Royal Hospital for Sick Children, the Royal Infirmary, the Medico-Chirurgical Society, and the Town Council.

In giving consideration to this matter, the Town Council have had before them a Report, dated 6th October, 1924, by the Medical Officer of Health on the "Present Requirements and Future Development of the Municipal Health Services and the Reciprocal Relation of these Health Services with the Joint Hospitals Scheme," and, in view of the importance of the proposed Joint Hospitals Scheme and the financial and other questions involved it has seemed desirable to include in this annual Report the following excerpt of the Report in question:—

HEALTH SERVICES.

PRESENT REQUIREMENTS AND FUTURE DEVELOPMENT OF THE MUNICIPAL HEALTH SERVICES AND THE RECIPROCAL RELATION OF THESE HEALTH SERVICES WITH THE JOINT HOSPITALS SCHEME.

In dealing with the subject of this Report from the point of view of the Town Council as Public Health Authority, it is proposed in the first place to state the present position of the Special Health Services of the Council and the urgency of their varying needs and the necessity for their development, and thereafter to discuss the nature of the interrelation of the City Health Services with the Joint Hospitals Scheme. In order, however, that the Town Council may determine the broad policy it intends to pursue in regard to the provision of the main institutional accommodation for the Special Health Services of the City, it is necessary that the members of the Council should have before them a general survey of the requirements of these services and of the financial commitments that such provision entails; and, in order that the whole subject may be made capable of ready comprehension, only a general view or résumé of the needs of each of the Special Health Services is given at this stage, and only general principles in connection with the Joint Hospitals proposals are set forth, without elaboration, except in so far as an occasional example may serve to make clear the principle involved. It may be taken, however, that the varying requirements of each of the special services as hereinafter summarised have been fully investigated, and may be regarded as necessary. The detailed investigation and measurement of the needs of the individual health services will be a matter for subsequent consideration by the Council.

Present State of Municipal Health Services.

The Special Health Services for which it is the duty of the Town Council to make institutional provision are as follows:—

1. Fevers—hospital provision.
2. Tuberculosis—hospital, sanatorium, and dispensary provision.
3. Venereal Diseases—in-patient accommodation and out-patient centre.
4. Welfare of Blind Persons—institutional training, hostels, and homes.
5. Maternity and Child Welfare—hospital beds for maternity cases and ailing children, homes, and centres.
6. Port Sanitation—hospital beds and quarantine.
7. Public Health Laboratories—bacteriological and chemical.
8. Public Health Administration—central offices and agencies.

The grants-in-aid paid by the Board of Health on approved capital and maintenance expenditure on these services amount to 75 per cent. in the case of the Venereal Disease Service, and to 50 per cent. in regard to Tuberculosis, Care of the Blind, Maternity and Child Welfare, and Port Sanitation.

The City health institutions as at present constituted are concentrated on the site at the City Hospital, Urquhart Road, and form an ideal nucleus for future development. At the City Hospital, there are the fever wards, with accommodation for 150 beds; the tuberculosis wards, with accommodation for 125 beds; the children's ward for wasting infants, with 20 beds; the skin and cleansing department, with 12 beds; the tuberculosis dispensary and X-rays department; the venereal disease sub-centre for out-patients; and the bacteriological and chemical laboratories. The nurses' home has accommodation for 50 nurses and 15 maids, and four temporary annexes throughout the hospital grounds provide supplementary accommodation for nurses and maids.

The building of the City Hospital was commenced as far back as 1874, the first patients being admitted to the hospital in 1877; and, with various extensions in 1887, 1893, 1909, and 1913, the hospital as it at present stands has been provided at a capital expenditure of £70,800, of which the present debt is £18,570. The area of ground embraced in the City Hospital site extends to 10 acres, of which over 2 acres are available for building extensions (plan submitted). These 10 acres of land belong to the Town Council, and, on the other side of Urquhart Road, and forming a natural extension of the City Hospital site, there is a considerable acreage of ground immediately contiguous to the Links which can be acquired by the Council, and which could be made available for a comprehensive scheme of City Hospital extension.

Apart from the City Hospital, there is the Burnside Home for Mothers and Babies, with accommodation for 10 mothers and 20 infants, situated on the Burnside-Forresterhill estate, and the Castlegate Child Welfare Centre, which is of a temporary hutment description, situated on the Exchequer Row slum clearance area. These two buildings are also the property of the Town Council. The Ante-Natal Annexe at the Maternity Hospital, which was presented by the Town Council to the Directors of the Maternity Hospital, provides 8 ante-natal beds and an outdoor department, and is maintained by the Council. These three premises, forming part of the institutional provision made under the Maternity and Child Welfare Scheme, were provided at a capital charge of £4,870, the debt on which is £233.

The total present debt, therefore, on the above institutions is £18,800.

Other institutional accommodation made available under the Maternity and Child Welfare Service comprises the Loch Street Home for Mothers and Babies, providing accommodation for 10 mothers and 10 babies; the Charlotte Street Day Nursery, giving daily accommodation to 50 children; and four other Child Welfare Centres throughout the City—all of these buildings being meantime rented by the Town Council.

The Venereal Disease Service of the Town Council is provided mainly at the venereal disease centre at the Royal Infirmary, the Council having contracted out the work to the Directors of the Royal Infirmary, who undertake to provide clinical and bacteriological services in so far as the Infirmary accommodation permits.

The Welfare of Blind Persons became a statutory duty of the Town Council under the Blind Persons Act, 1920. This Act permits the Council to provide services for blind persons either directly or through voluntary agencies. As the Council are aware, the voluntary agencies in Aberdeen are making more adequate provision for blind persons than are the other centres in Scotland, and meantime the Town Council's contribution to the welfare of the blind is confined to the maintenance of blind persons undergoing technical training in the Blind Asylum.

The Port Sanitary Service makes provision for the quarantine, clinical and disinfection requirements of the port.

The Municipal Laboratories, as already stated, are situated within the City Hospital grounds, and provide laboratory services both for the City Hospital and for the town generally.

The Central Administrative Offices of the Health Department are situated in Crown Mansions, and accommodate the main agencies for outdoor services.

The annual maintenance cost of all these special health services, including interest and sinking fund on the debt of £18,800 on buildings, is summarised from the accounts for 1923-24, as follows:—

Fevers—City Hospital,	£10,000
Tuberculosis—City Hospital, &c.,	16,500
Venereal Diseases—Royal Infirmary,	3,600
City Hospital Sub-Centre,	100
Welfare of Blind Persons—Maintenance of Trainees,	300
Maternity and Child Welfare,	10,500
Port Sanitation,	250
Public Health Laboratories,	2,000
Public Health Administration.	8,500
	£51,750

On this total expenditure of £51,750 there is received from the Scottish Board of Health as grants-in-aid a total sum of £16,500, leaving a net expenditure of £35,250 which has to be rated for by the Town Council.

Requirements and Development of Existing Municipal Health Services.

Prior to 1912, the health services of the Town Council were confined to matters concerning general conditions of health and to dealing with fevers, and it is only during the past twelve years that additional statutory enactments and regulations have made the Council responsible for comprehensive health services in relation to Tuberculosis, Venereal Diseases, Maternity and Child Welfare, and Welfare of Blind Persons. During the war and post-war years, however, difficulties in connection with building construction and finance have made it impossible to provide additional permanent institutional accommodation, with the result that the institutional accommodation for the additional health services has been found mainly within the buildings originally provided for the isolation and treatment of fever cases. Thus, the 125 beds at present devoted to tuberculous cases were made available by taking over and extending two wards originally provided at the City Hospital as part of the bed accommodation for fevers. So also the present accommodation for marasmic infants, extending to 20 beds, is part of the accommodation originally provided for fevers. This concentration of additional diseases within the Fever Hospital has necessarily led to considerable augmentation of the nursing and domestic staff, with the result that the nurses' home, which has accommodation for 50 nurses and 15 maids, at present accommodates 60 nurses and 20 maids, and an additional 30 nurses and 10 maids are accommodated in temporary and unsatisfactory annexes throughout the City Hospital grounds. It follows, therefore, that if the Town Council is to make adequate institutional provision for the special health services for which it is the Council's duty to provide, then extensive and costly additions to the existing institutional accommodation have to be faced.

It is impossible to forecast with accuracy the full development of the services above referred to, but it may be taken that the following is a measure of the developments which are required if the City is to maintain its high level of public health endeavour. The requirements are set forth in order of their urgency:—

(1) *Nurses' Home Extension.*

Additional accommodation is immediately required for 40 nurses and 15 maids of the existing staff at present inadequately housed, and it is estimated that an additional 55 nurses and 10 maids will be required to staff the additional wards which will fall to be provided. It follows, therefore, that an extension of the nurses' home to the extent of 120 beds, with, in addition, teaching accommodation for nurses and new kitchens for the Hospital, has to be contemplated.

(2) *Resident Medical Staff.*

The present accommodation for the resident physicians is altogether inadequate, and a new residence is urgently required.

(3) *Venereal Diseases.*

The Town Council are aware that the accommodation for the treatment of venereal diseases at the Royal Infirmary is inadequate. Representations to this effect have been made by the Infirmary Directors to the Council, and plans have been prepared with a view to providing increased in-patient and out-patient accommodation at the Infirmary. In giving consideration to this matter, it is necessary that the Town Council should have in mind the conditions under which the Venereal Disease Service developed, and that they should examine the results achieved under the existing arrangement. When the Venereal Diseases Regulations, 1916, made it the duty of the Local Authority to formulate a scheme for the early diagnosis and treatment of venereal infections, there was an increasing wave of venereal disease throughout the country due to war conditions. In this emergency the obvious course was to utilise existing centres of medical treatment, and accordingly the Royal Infirmary became the main treatment centre and was equipped for this new purpose. This arrangement entailed the contracting out of the venereal disease work to the Directors of the Royal Infirmary. In none of the other three chief cities in Scotland was the work contracted out in anything like the same degree. In Glasgow, while part of the work was contracted out to the voluntary hospitals, a main municipal centre was also established. In Edinburgh, the part of the Royal Infirmary utilised for a venereal disease centre became to all intents and purposes a municipal centre staffed and controlled by Edinburgh Town Council. In Dundee, the undertaking became wholly a municipal one. The record of the work done at these treatment centres in each of the four principal cities of Scotland is available for comparison, and the Table set forth in Appendix II. records the activities of these centres during the past five post-war years, when the centres can be regarded as functioning to their full extent. Examination of this Table shows that in Glasgow an average of 5·9 per 1000 of the population have received treatment at the Treatment Centres; in Edinburgh, an average of 6·2 per 1000 of population; in Dundee, an average of 7·7 per 1000; and in Aberdeen, an average of 3·6 per 1000. In other words, the treatment centres in Glasgow, Edinburgh, and Dundee have been doing double the amount of work on an equal population basis as compared with the work accomplished at the Aberdeen centres.

It must clearly be recognised that the personnel engaged in the work in Aberdeen are in no way responsible for the disappointing results obtained. On the contrary, their earnest endeavour to carry out their duties in inadequate premises has always been of a high order. Nevertheless, the inadequacy of the premises at the Royal Infirmary does not explain the meagreness of the achievement, since at a time when the City Hospital sub-centre was functioning unfettered, but in premises much less adequate than those at the Royal Infirmary, abundant evidence was obtained of the swelling volume of cases which could be attracted there and which proportionately exceeded the figures for the other three great cities. Nor is there any evidence to show that venereal disease is less rife in Aberdeen than in the south. On the contrary, reference to Appendix II. shows that the death-rate from syphilis and other venereal diseases and from parasyphilitic conditions in Aberdeen is in slight excess of the death-rate from these causes in the other three cities. The more I study all the causes that may have influenced the failure of the chief Aberdeen centre to attract cases, the more am I convinced that it is the atmosphere and environment of the dispensary of a general hospital which is inimical to successful results. Broadly speaking, the general dispensary is an end in itself. It provides treatment for a multiplicity of conditions which are usually capable of more or less rapid alleviation and cure. Thus the patient with a subcutaneous abscess wants the abscess evacuated and dressed, and there the service ends. In such a case social services can be largely discounted. The institutional services of any of the municipal services, however, are only a part, and often a small, though vital, part of the newer health measures. The newer health services are essentially social in character, and the social service must permeate every aspect of the work. The dispensaries of general hospitals are primarily organised on a charitable basis to provide certain clearly defined and limited curative services for the deserving poor, and I am satisfied that in such surroundings any communal health service, and especially such a communal service as that relating to venereal disease with its peculiar problems, must almost inevitably languish. In this respect the experience of Aberdeen has been the experience of Glasgow and other centres where venereal disease work has been farmed out.

The establishment of the chief venereal centre in the premises of the Royal Infirmary was further alleged to have an additional advantage in that the Infirmary receives most of the cases that suffer from the remote effects of venereal infection. Thus neurological, circulatory, and gynecological diseases appearing as late manifestations of venereal infection are commonly admitted to the wards of the Royal Infirmary, and it was considered advantageous that the venereal diseases clinical officer working on the premises should be available for consultation in connection with such cases. Such a contention probably holds good for all the clinical services of the Town Council. Thus the consultative services of the tuberculosis clinical officer would, no doubt, be helpful in connection with cases of pulmonary and surgical tuberculosis appearing in the course of the practice of the Royal Infirmary. But the advantages to be derived from an association of expert services under one roof are greater in relation to clinical services other than venereal services owing to the fact that the venereal infections are so protean in their clinical manifestations that it is impossible for any venereal clinician to be expert in all branches of the work. Basic knowledge of venereal investigation is essential to the expert neurologist and gynecologist. In any event, consultative services have always been made available to the fullest extent by the Town Council, and there is no argument that can be urged as to the desirability of having the institutional provision for venereal diseases at the Royal Infirmary that cannot be urged with greater justification in favour of such association for the other clinical services of the Council.

If these views are endorsed by the Town Council, then it necessarily follows that, in order to achieve the best results, the new buildings for the in-patient and out-patient treatment of cases of venereal disease should be made homologous with the institutional provision of the other health services of the City. The urgency of the need for new institutional accommodation for venereal diseases is very great, and under this heading there falls to be provided 30 beds for in-patients and an out-patient department.

(4) *Tuberculosis*

The need for the early provision of hospital and sanatorium beds for cases of tuberculosis is accentuated by the necessity which exists for setting free the two wards at present devoted to tuberculosis in order that they may be made available for fever cases. As already pointed out, these two wards were originally part of the hospital provision for fevers, and, in their adaptation for purposes of tuberculosis, the Town Council deliberately refrained from making any claim for capital expenditure thus incurred, having in view the desirability that these wards should, come time, revert to their original fever uses. It is necessary to provide a total of 200 beds for tuberculous cases, and it is suggested that these 200 beds should be a new provision for tuberculosis, thus earning full capital and maintenance grants.

(5) *Fevers.*

The diminution of fever beds to a quite inadequate number has been explained as being due to the encroachments made on the fever beds by the emergency provision of beds for tuberculosis and marasmus. The Town Council will have in mind that, in accordance with instructions from the Scottish Board of Health, additional institutional accommodation falls to be made for measles and whooping-cough. The two wards liberated by the provision of new accommodation for tuberculosis as above indicated, would make adequate institutional provision for measles and whooping-cough. The Town Council will also have in mind that several additional infectious diseases, including acute poliomyelitis, epidemic encephalitis, the dysenteries, acute primary and influenzal pneumonias, and ophthalmia neonatorum, have been made compulsorily notifiable in recent years, and that it is a function of the Local Authority to make provision for the isolation and treatment of these infections. In this connection, it has to be pointed out that the utility of the present reception block of the hospital has been greatly curtailed by the setting apart of its main section for the accommodation of marasmic infants. The reception block affords the only accommodation at present available for the isolation of cases of mixed infection. It is greatly to be desired that the whole of the reception block should be set free for the accommodation of the additional infectious diseases for which provision has now to be made, and that a new cubicle isolation ward of 30 beds for the segregation of cases of mixed infection, for single cases of infection, and for doubtful cases, should be provided. It is to be noted that no Treasury grant is available for ordinary fever beds, while beds for tuberculosis and marasmus rank for both capital and maintenance grant.

(6) *Maternity and Child Welfare.*

The removal of the marasmic infants from the reception block, as above postulated, would necessitate the provision of a marasmus ward of 30 beds. It is important that this ward should be in close association with wards accommodating other acute diseases.

The Maternity Hospital, accommodating 20 beds, with, in addition, 8 ante-natal beds, is a hopelessly inadequate maternity provision for the City of Aberdeen. This provision should at least be doubled. It is improbable, however, that voluntary effort in this direction will meet this requirement, and, accordingly, it will fall to the Town Council to provide an additional 20 beds under the Maternity and Child Welfare Scheme either separately or in conjunction with the Directors of the Maternity Hospital.

So far as the homes for mothers and babies, the day nursery, and the child welfare centres are concerned, Burnside Home is satisfactory, and should meantime be retained. The Castlegate Child Welfare Centre on the Exchequer Row area is merely a temporary hutment, and it is suggested that a permanent child welfare centre, day nursery, and home for mothers should be erected on the Exchequer Row site. This would permit the giving up of Loch Street Home and Charlotte Street Day Nursery, both of which are of an inadequate description, and are rented.

(7) *Welfare of Blind Persons.*

The Blind Persons Act, 1920, permitted the Town Council, subject to the approval of the Scottish Board of Health, to make such arrangements as they considered desirable for promoting the welfare of blind persons either through existing voluntary agencies or by taking over such agencies and discharging their functions to municipalise the service. As has already been stated, the Council are making full use of the existing voluntary agencies, and are making provision for the maintenance of blind persons undergoing technical training in the Blind Asylum. There is a possibility, however, that the Blind Persons Act, 1920, may be amended by the Amendment Bill of 1924 (herewith submitted), which is at present before Parliament, with the result that it will become the statutory duty of the Council to municipalise entirely the Welfare of Blind Persons Service. Should this eventuate, the Council will have to assume the whole liability at present borne by the Blind Asylum and the Town and County Association for Teaching the Blind in their Homes, subject always to deduction of the legacies and other assets belonging to these agencies. Not only so, but should the Blind Persons Act be so amended, it will be the duty of the Council to provide a hostel for blind trainees and workers, and a home for the aged blind and unemployable blind. The Directors of Aberdeen Asylum for the Blind are at present contemplating a necessary large extension of their workshop accommodation, and the provision of such extension would also have to be met by the Town Council should the Amendment Bill be enacted.

(8) *Municipal Laboratories.*

The existing laboratories at the City Hospital were originally provided and extended to meet only the bacteriological requirements of the Hospital. In 1920, the whole of the bacteriological work of the City was transferred to these laboratories. In 1923, the Council appointed a whole-time Chemist and City Analyst, who has also had to be accommodated within the existing laboratories. It will be obvious, therefore, that the existing laboratories provide quite inadequate accommodation for the greatly increased laboratory services. The existing laboratories are situated on the upper floor of the Tuberculosis Institute, and the whole of this building is now required for the tuberculosis dispensary and for the X-rays department. It follows, therefore, that new and greatly extended municipal laboratories will require to be provided.

(9) *Central Administrative Offices.*

The Council are aware that the Health Department requires new administrative headquarters in place of the present premises, which are rented at an annual cost of £190. It is proposed that the new administrative offices should be erected on the Exchequer Row site as part of the contemplated extension of the Municipal Buildings.

The estimated capital expenditure that would be involved in providing the foregoing requirements and developments of the special health services of the Town Council is as follows:—

1. Nurses' Home Extension—120 beds, at £300 per bed,	£36,000
2. Medical Residents' Quarters,	5,000
3. Venereal Disease—30 beds and out-patient department	15,000
4. Tuberculosis—200 beds, at £300 per bed,	60,000
5. Fevers—cubicle isolation ward of 30 beds, at £400,	12,000
6. Maternity and Child Welfare—	
(*a*) Marasmus ward of 30 beds,	9,000
(*b*) Maternity Hospital—20 beds,	8,000
(*c*) Child Welfare Centre, Day Nursery, and Home for Mothers, on Exchequer Row site,	20,000
7. Welfare of Blind Persons—	
(*a*) Hostel,	6,000
(*b*) Home,	6,000
(*c*) Workshop extension,	8,000
8. Municipal Laboratories,	12,000
9. Central Administrative Offices,	30,000
	£227,000

The annual instalment of principal and interest on this sum of £227,000, spread over a period of thirty years, would be £15,000, which would rank for grant to an average extent of 33 per cent., leaving an annual payment of £10,000 on interest and sinking fund to be met by the Town Council, which is equivalent to a rate of about 2d. per £ on the rateable value of the City.

The maintenance expenditure that would be involved in the functioning of these additional developments and requirements of the special health services is estimated to average £24,000 annually—one-third of which sum, on the average, would be recovered as grant, leaving a net annual expenditure of £16,000, which would have to be rated for by the Town Council—being equivalent to a rate of 3d. per £.

Having in view the extent of these institutional requirements of the municipal health services, it is suggested that the time has come for the Town Council to adopt a policy of progressive building construction—the programme of work and expenditure to be reviewed at regular intervals of, say, five years.

Other Local Authorities Exercising Health Functions.

Having thus reviewed the condition of the health services of the Town Council and their more pressing needs, it is desirable at this stage to consider the functions of other local Health Authorities providing health services in the City, and their relation to the Town Council. The Parish Council is responsible for the medical relief of the poor; the District Board of Control deals with mental deficiency and lunacy; the Education Authority provides the school medical service; the Burgh Insurance Committee controls the medical service for insured persons; and the Local War Pensions Committee makes medical provision for discharged and disabled war pensioners. The unnecessary administrative expenditure and overlapping of health effort which results from the separate functioning of these different authorities is common knowledge.

The need for reform is fully set forth in the Board of Health Report on a Reformed Local Authority for Health and Public Assistance by the Consultative Council on Local Health Administration and General Health Questions (herewith submitted). The report is of importance at this juncture, and is worthy of careful perusal. It recommends, with reasons, that no new *ad hoc* authority for health purposes should be created, and that the Town Council should become the local Health Authority for the unified health service. It further recommends that there should be no co-option of outside persons to membership of the Local Authority, but that committees of the Local Authority should be empowered at the discretion of the Local Authority to co-opt persons to serve on the committees in an advisory capacity and without the power of voting. Should this unification of the public medical services take place—and it is probably the most immediately pressing of health reforms —then it would follow that the Town Council would have to take over Oldmill Hospital. It has to be pointed out that Oldmill Hospital makes provision for 900 beds, and that only 500 of these beds are occupied (see Appendix III.). The number of these beds to be occupied under the Poor Law System is likely to diminish, so that in the event of the Town Council being made responsible for the poor law medical service, it would be left with a hospital of 400 beds at Oldmill entirely unoccupied. Oldmill Hospital was erected at a total capital expenditure of £126,000.

Voluntary Medical Institutions.

The institutional provision made by the voluntary medical agencies and their need for extension next falls to be considered.

The Sick Children's Hospital at present provides 80 beds—a wholly inadequate number. The present site and buildings are quite unsuitable, and the Directors are in a position to proceed immediately with the erection of a modern Children's Hospital of 150 beds on a much more extensive site.

The Royal Infirmary makes provision for 290 beds in addition to its large out-patient department. It forms the main teaching hospital of the medical school. This number of beds has been found to be unequal to meet the demands made for in-patient treatment, and it is not considered desirable that the Infirmary should extend on its present site. Meantime money is not available for the transference and extension of the Infirmary on a greatly enlarged site.

Reference has already been made to the inadequacy of the Maternity Hospital with its 20 maternity beds and 8 ante-natal beds. A new maternity hospital, providing 40 maternity beds and 10 ante-natal beds, is an urgent requirement.

Morningfield Hospital is of a modern description and provides 82 beds for cases of incurable disease. The demands made on this hospital are always in great excess of the available bed accommodation.

The Eye Institute provides 6 beds for ophthalmic cases.

The City Dispensary and Vaccine Institution is housed in buildings of a modern type which adequately meet dispensary requirements.

Aberdeen University Medical School.

All the University departments of the Medical School are housed in Marischal College. The academic influence of, and the spirit of inquiry and progress associated with the University Medical School should permeate the system of the whole of the health services of the City, voluntary and statutory alike. It is for this reason that the organisation of the health services of Aberdeen requires much more careful planning and development than would be the case in a city remote from the sphere of University influence.

The Town Council are well aware of the importance of the organic relationship which exists between the medical school and the health services of the City. The whole matter of such a relationship is carefully considered in the Ministry of Health Interim Report on the Future Provision of Medical and Allied Services by the Consultative Council on Medical and Allied Services (herewith submitted). This report is of importance and is worthy of careful perusal. It sets forth a draft scheme for such a medical organisation as is being contemplated in Aberdeen.

Joint Hospitals Scheme.

The aims and objects of the Joint Hospitals Scheme have been put before the Town Council by Professor Ashley Mackintosh at a conference of representatives of the Royal Hospital for Sick Children, the Royal Infirmary, the Town Council, the University Court, and the Medico-Chirurgical Society. (Print of address herewith submitted.) Stated briefly, and in terms of the resolutions adopted at a meeting of the Medico-Chirurgical Society, the need for new and more extensive institutional accommodation by the majority of the voluntary and statutory health services of the City makes this a specially opportune time for the consideration of a common site of such extent as to provide eventually for the whole hospital system of the City. It is felt that the advantages of the concentration of the hospitals on such a common site would be incalculable in the interest of patients, as well as of the training of medical students and nurses. Such a concentration would render it practicable to transfer to the same site the University departments most closely associated with clinical work, such as those of Medicine, Surgery, Pathology, Bacteriology, and Biochemistry. The transfer would be of inestimable advantage to the clinical work of the hospital, to medical education, and to the scientific investigation of disease.

The medical authorities who, by reason of the urgency of their requirements, were originally deemed capable of initiating the scheme, were the Directors of the Sick Children's Hospital, the Directors of the Royal Infirmary, the University Court, and the Town Council. These four participating bodies have approved generally of the scheme. The Burnside-Forresterhill estate has been selected as an adequate site, and a lay-out plan of the area has been prepared by Colonel D. J. Mackintosh and Dr. Wm. Kelly, who have also submitted a memorandum on the subject. (Plan submitted; for memorandum see Appendix IV.) The allocation of the land as laid down by these memorialists was approved by the Town Council in terms of the Council Minutes of 1st October, 1923, and it is now proposed that the Town Council should proceed to obtain a Provisional Order which would enable the Council to dispose of the Burnside-Forresterhill estate to the various participating bodies in accordance with this allocation.

The participating authorities have also drafted a Trust Deed (herewith submitted) relative to the scheme, which has been approved by the Directors of the Sick Children's Hospital, the Directors of the Royal Infirmary, and the University Court; and this draft Deed now comes before the Town Council for due consideration.

Consideration of Scheme.

In the original proposals it was contemplated that the Town Council would erect a tuberculosis hospital and sanatorium of 200 beds on the Joint Hospitals site, thus liberating the tuberculosis wards at the City Hospital for ordinary fever cases. The allocation of the Burnside-Forresterhill estate is on the lines of this proposal. In the time which has elapsed since the original proposals were formulated, opportunity has been afforded of more detailed examination of all the results that would accrue to the municipal health services were the institutional accommodation for tuberculosis to be removed to the Joint Hospitals site, leaving the City Hospital to function on its present site, with the result that certain grave and, to my mind, fatal objections to this proposed disruption of the medical institutions of the Town Council have presented themselves. Thus, it will generally be conceded that the concentration of the municipal medical institutions on one site, as at present obtaining at the City Hospital, is an ideal arrangement in so far as these medical institutions are concerned. Such a division and separation of the municipal medical institutions as is contemplated in the joint hospitals scheme is contrary to the main principle of the scheme. It is generally held, however, that the active participation of the Town Council in the joint hospitals scheme is essential to the success of the scheme; but to my mind the scheme fails with the disintegration of the municipal medical unit. Not only so, but it is common knowledge that the Directors of the Royal Infirmary have yet to find the money for the proposed new infirmary, and it is conceivable that the money for this purpose may not be forthcoming within a reasonable time. Failure of the Directors of the Royal Infirmary to participate in the joint hospitals scheme would assuredly negative the scheme, and I am of opinion that it would be a grave mistake for the Town Council to disperse their medical institutions until they had a very definite assurance that the transference of the Royal Infirmary would take place. Even should the Directors of the Royal Infirmary be able to assure the Council that the transference of the Infirmary would be accomplished, I still maintain that the division of the Town Council institutional services between the Joint Hospitals site and the City Hospitals site would be altogether unsound for reasons of efficiency, administration and finance. In other words, the Town Council must come to a decision as to whether they are to go with all their institutional services to the Joint Hospitals site, or to develop their additional institutional services on the City Hospital site. The fundamentally important point that the Town Council should have in mind in connection with the special health services for which they are responsible is to have a clear recognition that nothing should be done that would result in the final disruption of their organised public health institutions.

If this point of view is accepted, it follows that should the Town Council determine to transfer their institutional health services to the Joint Hospitals site, then it would be advisable that the additional hospital accommodation now required by the Council, and estimated above to cost £227,000, should be provided on the Joint Hospitals site. But the existing hospital accommodation at the City Hospital cost £70,800, and has a present debt on it of £18,570, and it is estimated that the cost of providing buildings equal to those at the City Hospital would at the present time amount to £250,000; so that the decision of the Town Council to go to the Joint Hospitals site would mean that they would have to spend eventually £250,000 in transferring the City Hospital to this site and an additional £227,000 in providing the extensions which are at present required. In other words, the decision of the Council to develop their medical institutions on the Joint Hospitals site visualises a capital expenditure of about half a million pounds.

Interrelationship of Participating Bodies to Scheme.

For the purpose of examining the relative position of the various medical bodies interested in the joint hospitals scheme, four departments of medical activities fall to be considered, namely (*a*) the Medical School, (*b*) the Voluntary Hospital Service, (*c*) the Municipal Hospital Service, and (*d*) the Medical Profession and its organisation. Each of these departments has its own special problems to solve and each has to make special adaptations in order to fit into an organised joint medical service.

(a) The University Medical School.—The essential duties of the medical school are teaching and fundamental research work, and to this end the academic staff requires access to clinical and pathological material while at the same time being safeguarded from the burden of routine clinical and laboratory work. It would be of enormous advantage to the medical school, therefore, to have organic association with the joint hospitals on the common site. But the advantage of such a University association to the hospitals and patients is equally great, since there is nothing which so increases the efficiency of a hospital service as to be the centre of teaching and research. Indirectly, there is another advantage which accrues to the community in that more highly qualified medical practitioners are provided by the improved training of medical students which such an arrangement permits. It is important that the Town Council should give the fullest consideration to these aspects of the subject.

Questions of finance do not arise here, since financial provision for the proper functioning of the University medical school, on the one hand, and of the hospitals, on the other hand, are separate and distinct. This point wants some elaboration. In my opinion, it would be prejudicial to the best interests of both the medical school and the hospitals for the University laboratories to absorb the work of the municipal laboratories. Any such arrangement would interfere with the essential teaching and research work of the academic staff and would subject the laboratory requirements of the health services to the influence of professorial needs or caprice. The Town Council should not be parties to any arrangement which would interfere with their direct control of public health laboratory services.

(b) The Voluntary Hospital Service.—The problems that confront the directors of the voluntary hospitals in endeavouring to meet their present and future requirements and the adjustments in organisation and management that are entailed in entering into a joint hospitals scheme are peculiarly difficult of solution. At present the Sick Children's Hospital and the Royal Infirmary are participating bodies under the joint hospitals scheme, but, as already pointed out, a new Maternity Hospital is one of the most urgent requirements of the City's medical services, and whenever the Town Council are in a position to do so, they will require to aid the Directors of the Maternity Hospital in obtaining a new and greatly enlarged hospital for this purpose. It is obvious, therefore, that the Maternity Hospital ought to be a participating body in the joint hospitals scheme, and that the Directors of the Hospital should take a full share in the present deliberations.

The most urgent problem of the voluntary hospitals is one of finance. The cost of all the commodities which they have to buy has increased, and the increasing complexity of the investigation and treatment of disease makes it necessary year by year to incur ever fresh expenditure. Various reports on the position of voluntary hospitals make it abundantly clear that the future requirements of the voluntary medical institutions will not be met from voluntary sources whatever new intensive methods of raising money by voluntary means are devised, and it is generally believed that future State asistance to the voluntary institutions will be given through local authorities, these local authorities being contributing bodies. If this eventuates, then it necessarily ensues that any deficiency in the finances of the voluntary medical institutions will ultimately have to be met by the Town Council. A single example will serve to illustrate this point. The Royal Infirmary has at present 290 beds, and is in a position to maintain these beds. In Professor Ashley Mackintosh's address to the participating bodies in the joint hospitals scheme, it is laid down that the Royal Infirmary requires 600 beds. It follows, therefore, that in addition to finding from voluntary sources the money to build the new 600 bed hospital, the Royal Infirmary will require to find from voluntary sources money for maintenance double in amount of what it at present finds for the maintenance of 290 beds. It is generally admitted, however, that voluntary sources of hospital income are being very fully exploited in Aberdeen, and in view of the possibility of the Town Council being eventually made responsible for hospital deficits, I deemed it important to communicate with the Scottish Board of Health with a view to ascertaining the position of the Town Council were the Council prepared to assist the Royal Infirmary and Maternity Hospital in securing their needed transference and extension. A copy of the correspondence with the Board of Health is submitted (see Appendix V.). The Board's reply indicates that in so far as grant-aided medical services are concerned grant would be obtained on approved capital and maintenance expenditure. Not only so, but the joint hospitals scheme is so great in its conception and the benefits to be derived from it are so enormous that there is room for the belief that expenditure by the Town Council on the scheme beyond the limits of grant-aided services might receive sympathetic consideration and be subsidised by the Board. At least there is precedent for such assistance.

Another function of the directors of the voluntary hospitals which calls for consideration in the adjustment of the joint hospitals scheme, is that of their relation to medical teaching. At present it is the function of the directors of voluntary hospitals to appoint the staff in their institutions who will be responsible for medical teaching, and it is suggested that in the re-organisation which the joint hospitals scheme implies, consideration should be given to the proposal that the University should be the body primarily concerned in the selection of medical teachers. This suggestion is made with the full realisation of the high competency of the directorates of the voluntary hospitals and with a full realisation of the magnificent achievements of the voluntary hospitals in providing medical services and research.

(c) The Municipal Hospital Service.—The first consideration of the Town Council in its relation to the joint hospital scheme is a financial one, and it has been shown that the development of the municipal medical services within the scheme will eventually involve a capital expenditure of half a million pounds. It is necessary that the Town Council should be satisfied that such an expenditure is essential to the provision of an adequate medical service, and accordingly a further survey of the resources of the City's medical institutions is requisite to determine this point. It has already been pointed out that the Council will be required to take over Oldmill Hospital when the Public Health Authority is reformed. Working on this hypothesis, it may be contended that when new provision has been made for the Sick Children's Hospital and Maternity Hospital as contiguous units, on a greatly enlarged site, there would be four hospital centres, viz.:—(1) Oldmill Hospital, (2) the Royal Infirmary, (3) the City Hospital, and (4) the combined Sick Children's Hospital and Maternity Hospital, each of which would be capable of expansion and of providing an adequate hospital service. Thus, ground is available for the expansion of the City Hospital and Oldmill Hospital: the Sick Children's Hospital and Maternity Hospital could expand on their new site; and the Royal Infirmary could acquire Woolmanhill Barracks and adjacent property and so expand on its present site. Such expansions would provide sufficient hospital accommodation for the City for many years to come, and might be accepted as the hospital policy of the immediate future were it not for one very grave objection. Such a policy of hospital expansion makes no provision for utilising in the best manner the benefits to be derived from contiguity and organic association with the University Medical School, and, as already stated, the benefit to be derived by the hospitals from such contiguity and association is so great that no hospital policy which does not envisage and incorporate such an association can be regarded as adequate in a University town. This matter of physical association with the

medical school is the real crux of the whole problem of hospital provision, and every avenue must be explored to secure the attainment of this physical association with the University if the hospital services are eventually to be of the best description. The point need not be laboured. The fact can be accepted that failure to secure physical association with the University means failure to provide the best and highest type of hospital service. It is the realisation of this ideal which demands a joint hospitals provision on a common site.

I am not greatly impressed with the other arguments in favour of the joint hospitals scheme, such as the advantages of having common services and equipment, common staff accommodation and common departments of special medical requirements such as X-rays, electro-therapeutics, and clinical laboratories. On the contrary, I am very definitely of the opinion that the limitations of size within which any hospital unit can efficiently function are strictly defined and lie within the range of from 400 to 800 beds. Within these limits hospital management can be vital and can adequately measure and supply hospital requirements. Beyond these limits of size, the hospital unit is uneconomical and unco-ordinated in function, or, economy being imposed, it becomes a dull, unwieldy machine. A modern hospital is not a machine. It is a vivid, vital agency. Provision would have to be made for these factors in efficient hospital management as an essential part of the new joint hospitals organisation.

It will be obvious that should the Town Council undertake to transfer their institutional health services to the joint hospitals site, then the present allocation of the site would have to be completely revised, and the present lay-out plan scrapped. It would be futile at this stage to elaborate in any detail such a reconstructed hospital plan, but it may be indicated that in the new plan there would probably be five main medical units, viz.:—(1) a comprehensive medical unit (including fevers); (2) a surgical unit; (3) a combined Maternity Hospital, Sick Children's Hospital, and other maternity and child welfare institutions; (4) the health services laboratory unit· and (5) the University unit. It is contended, therefore, that it would be unwise at this stage to take any action to obtain a Provisional Order to enable the Council to dispose of the Burnside-Forresterhill estate under the present allocation. In view, however, of the urgent requirements of the Sick Children's Hospital and the desire of the Directors to proceed at once with the erection of a new hospital, it is suggested that the Town Council should feu off to the Directors a site on the Burnside-Forresterhill estate, which, while meeting all the requirements of the new Sick Children's Hospital, would not interfere with the development of the estate as a site for the joint hospitals.

A matter which gives the Town Council very grave concern in their deliberations as to becoming an actively participating body in the joint hospitals scheme has reference to the question of power to control. I am well aware that this matter of the control of the joint hospitals bristles with difficulties, and that by raising the question at this stage there is a possibility of the whole scheme being abandoned. But I am satisfied that the scheme is too big, and the decisions which have to be made too momentous to permit of narrow parochial views being entertained by any of the interested authorities. And the question of control is a fundamental one, and will determine the ultimate success or failure of the scheme. It is useless to continue to speak of the joint hospitals scheme. The whole project implies one common hospital under one management. Were it not so, then it would be infinitely better for the various hospital units to remain dispersed as they are at present rather than to be confined together on one site, cribbed and cabined, with separate managements and separate aspirations. In this matter of hospital control, the Town Council are bound by statutory obligations which they cannot properly evade. For the proper functioning of the statutory health services they and they only are responsible. Conciliate and adjust as they may, the Council cannot subjugate the interests of these services to other interests, nor can they properly delegate their powers to any other body. The requirements of each of the statutory health services extend far beyond the provision of institutional accommodation—they extend to the supervision of the people in their homes, and the institution is the centre from which these activities radiate. Any failure of access to or control of the institutional part of the service renders ineffective all other activities. The present organisation of the Town Council's Maternity and Child Welfare Service well illustrates this point. With the best intentions and in an effort to harmonise the activities of the newer service with the activities of the Maternity Hospital, the Council presented an ante-natal annexe, consisting of an out-door department and eight beds, to the hospital, and have made themselves responsible for maintenance. This ante-natal department accordingly functions entirely separately from the other activities of mother and child welfare work. It no doubt undertakes the treatment of late disorders of pregnancy just as the maternity hospital provides services for mothers in labour and during the puerperium, but there its activities cease. This ante-natal institutional provision, which should be the centre of investigation into every department of ante-natal and post-natal hygiene, sickness, and death, functions in the above limited manner and renders comparatively nugatory a large part of the Health Department's activities in controlling ante-natal conditions and conditions of child life. The financing of the municipal health services is too great a burden to permit of expenditure being incurred without a maximum of good being derived from it. The failure of the Venereal Disease Service has already been discussed. Sufficient has been said to indicate that unless the whole of the machinery is within the hands of the Local Authority, the municipal health services fail to make the provision for which they were designed.

If this point of view is accepted, it will determine the extent to which the Town Council should seek control of their medical institutions within the common hospital scheme. The proposed composition of the Joint Hospitals Trust must here be taken into consideration. There are only three Town Council representatives out of a Trust membership of twenty-four, and while the immediate function of the trustees will be to hold and allocate the hospital lands, nevertheless there will be a tendency for the final managing and controlling body of the common hospital to be found according to representation on the Trust. If the views expressed above are substantially correct as to the policy which the country as a whole will adopt in connection with future hospital provision, it follows that, in a common hospital the financial commitments of which will have to be met in an increasing degree by the Town Council, a representation of three out of twenty-four appears to be obviously unreasonable. Altogether apart from this, the formation of an independent committee of management for the common hospital means the setting up of a new *ad hoc* health authority, and in the report on a Reformed Local Authority for health and public assistance already quoted proposals concerning new *ad hoc* health authorities have been unanimously considered undesirable.

(d) The Medical Profession.—The carrying out of the common hospital scheme would entail a new relationship of the medical profession to public health administration. The proper interests of the profession will have to be identified with those of the scheme, and such readjustments are exceedingly complex. They are essentially a matter for the consideration of medical practitioners themselves.

Recommendations.

1. In view of the magnitude and complexity of the subject of this report, it is suggested that it is not advisable at this stage for the Town Council to come to any final decision regarding future hospital development.
2. In view of the urgent requirements of the Sick Children's Hospital, it is suggested that the Town Council should feu off to the Directors of the Sick Children's Hospital a site on the Burnside-Forresterhill estate, which, while meeting all the requirements of the new Sick Children's Hospital, would not interfere with the development of the estate as a site for a common hospital.
3. It is suggested that the Town Council should approach the other participating bodies in the joint hospitals scheme in order to ascertain if it is practicable to secure such a reconstruction of the plan of the common hospital as is indicated in the substance of this

report, and to ascertain whether means can be devised to give the Council such control of the common hospital as the statutory medical services require and as is warranted by financial commitment.

4. It is suggested that, in order to permit of this readjustment of plan and determination of control, and in order to give the various participating bodies time to secure necessary resources, the Town Council should undertake to reserve the Burnside-Forresterhill estate for common hospital purposes for a period of, say, ten years.

Conclusion.

The grave decision which rests with the Town Council as to the transference of their medical institutions to the Burnside-Forresterhill site with a view to securing one common hospital for the City will determine hospital policy in Aberdeen for a century or more. In the midst of a multiplicity of interests and authorities, and confronted with present heavy financial responsibilities for health services—financial responsibilities which are bound to be greatly increased in the near future—the long view would appear to be the sound view. The Council have to decide now whether their successors fifty years hence will be able to say that a great decision was made and a great policy adopted, or whether they will be able to point to a lack of vision similar to that which permitted the reconstruction of Marischal College and the Royal Infirmary on their present sites. Out of the welter of facts and probabilities, it would seem that there would one day emerge two great authorities responsible for medical services—one the Town Council, directly responsible for the health services, and the other the University, directly responsible for medical education. If a common hospital and medical school on one site is to be achieved, it will require a long period of growth before fruition. It will require statesmanship and courage of a high order. It means the ultimate affiliation of all the bodies at present providing health services.

In terms of the Minutes of Council of 1st December, 1924, the Town Council resolved to sell to the Directors of the Royal Hospital for Sick Children the area of land on the Burnside-Forresterhill Estate selected as the site for the new Sick Children's Hospital, and further resolved that the remainder of the estate should be reserved for a period of five years from Whitsunday, 1925, so that the participating bodies in the Joint Hospitals Accommodation Scheme may have the opportunity during that period of acquiring for hospital and medical teaching purposes, such portions as may be agreed upon between the Council and the participating bodies.

HOSPITAL SERVICES (SCOTLAND) COMMITTEE.

While the hospital and ancillary services in Aberdeen have thus been found to be inadequate, a similar inadequacy has been experienced throughout the whole country, with the result that the President of the Scottish Board of Health in 1924 appointed the Hospital Services (Scotland) Committee, the terms of reference to the Committee being "To inquire into and report upon the extent and nature of the inadequacy of the present hospital and ancillary services in Scotland, and to make recommendations for the development and maintenance of those services to meet the needs of the community."

In giving evidence before this Committee in January last, I submitted, in addition to the above report on the Health Services of Aberdeen, the following information:—

Inadequacy of Voluntary Hospital Accommodation.

The inadequacy of the institutional accommodation for the municipal health services has been measured in sufficient detail in terms of the Health Services Report, but it seems desirable to consider further the inadequacy of the accommodation in the voluntary hospitals, with special reference to the Royal Infirmary. Thus, Professor Mackintosh has estimated the requirements of the new Royal Infirmary at 600 beds, as compared with the 309 beds at present provided, but he has not submitted the figures on which his estimate is based. The information contained in Appendix I. relative to the Royal Infirmary is accordingly submitted.

It will be seen from Appendix I. that the Royal Infirmary has a total waiting list of 316 cases definitely ascertained to be in need of institutional treatment. When, however, the information obtained in response to a questionnaire addressed to medical practitioners within the City on 15th January, 1925, is analysed, it is found that there were 328 known surgical cases, 127 known gynecological cases, and 380 known medical cases, or a total of 835 known cases in the practices of the medical practitioners of the City at that date which, in the opinion of the medical practitioners, required institutional treatment that could not be obtained owing to the existing inadequacy. Not only so, but the same questionnaire elicited the further information that out of the total cases requiring institutional treatment in private and panel practices, 48 per cent. of surgical cases, 53 per cent. of gynecological cases, and 35 per cent. of medical cases failed to secure admission to hospital at the proper time on account of lack of accommodation. The discrepancy between the figures as shown on the waiting list of the Royal Infirmary, on the one hand, and as obtained from the medical practitioners, on the other hand, indicates that the waiting list is no real measure of the extent of the hospital inadequacy, and would appear to indicate further that the shortage of institutional accommodation is of such an extent that considerable numbers of cases requiring surgical or medical treatment but with a minor disability not resulting in complete disablement, never appear on the hospital waiting lists at all. In other words, there would appear to be a considerable number of people, even in the large hospital centres, who are compelled to go on through life with definite impairment of physical efficiency, and who never receive treatment, owing to the inadequacy of the hospital provision.

Some relief of this proved inadequacy of accommodation at the Royal Infirmary might be obtained were the Town Council to make institutional provision within the Fever Hospital for those cases of pneumonia and extra-pulmonary tuberculosis which at present receive treatment at the Infirmary. Such relief would be limited, however, since it is found that the total cases of pneumonia treated at the Infirmary in 1924 numbered 58, and, with an average duration of stay of 27 days, it is found that there would be 4 beds set free by the exclusion of pneumonia cases. So also with tuberculosis, the total tuberculous cases treated in the Royal Infirmary in 1924 numbered 119, with an average stay of 47 days, and the removal of these cases to the Fever Hospital would set free an additional 15 beds. Even if further relief were to be obtained by the transference to the Fever Hospital of 15 cases of acute rheumatism with an average stay of 49 days, there would be set free 2 additional beds. In all, therefore, a total of 21 beds would be set free by such a transference as is here instanced; and as indicated in the report on the municipal health services, such a transference cannot properly be contemplated without the provision of new accommodation at the Fever Hospital. Not only so, but as has already been pointed out in the report on the municipal health services, the Royal Infirmary forms the main teaching hospital of the medical school, and the transference of these cases to the Fever Hospital would further seriously deplete the material essential for clinical teaching. It would appear, therefore, that Professor Ashley Mackintosh's estimate of 600 beds for the new Infirmary is a reasonable one and is substantially correct, but no funds are available for the required transference and extension.

The urgency of the need for the transference and extension of the Sick Children's Hospital does not require to be measured in detail. It is so real and imperative that the

Directors of the Hospital, following on an intensive campaign to raise capital, have acquired the necessary ground on the Burnside-Forresterhill site and are proceeding immediately to the erection of a new hospital of 128 beds, as compared with the 80 beds at present provided.

The urgency of the need for the provision of a new Maternity Hospital of 50 beds to replace the existing hospital of 28 beds has already been sufficiently emphasised.

Financial Considerations.

The need for the extension of the municipal and voluntary hospitals having thus been measured, it is important to consider how these extensions are to be financed. The capital and maintenance expenditure, after relief by grants-in-aid, which will have to be met in extending the municipal health services, will fall on the rates, and, in general, progress in this direction will depend largely on the industrial prosperity of the City.

It is when the financing of the extensions of the voluntary institutions comes to be considered that real difficulties arise. Thus, accepting the statement on the evidence submitted that the Royal Infirmary requires transference and extension from 300 beds to 600 beds, and assuming that the new Infirmary will cost £600 per bed to build, then the Directors of the Infirmary are at once faced with the problem of raising a sum of £360,000 for initial capital expenditure. It may be said at once that the proposal to raise such a sum from voluntary sources need not be regarded as in any way impracticable. Sums almost as large have formerly been obtained in Aberdeen from voluntary sources to build institutions the necessity and advantage of which made a wide appeal. It is not the initial capital expenditure that is the real problem of voluntary hospital extension: it is the maintenance expenditure of the extended service that is the fundamental difficulty. Thus, with the Royal Infirmary with 300 beds, the annual maintenance charges amount to £30,000, and so for purposes of discussion it may be assumed that the maintenance of the new 600-bed hospital will cost annually £60,000. It is the problem of finding annually this additional £30,000 for maintenance that is the crucial consideration. A wide appeal for a specified capital expenditure would have every prospect of success, but the success of such an appeal leaves the charitable public who have contributed to that success less able to meet annually their regular contributions to maintenance expenditure, and, as has already been stated, it is generally admitted that voluntary sources of hospital income are at present being very fully exploited in Aberdeen. As an alternative to doubling the annual voluntary levy an effort might be made to expand the initial appeal to such an extent that funds would be available not only to build the additional beds but to endow them. For the maintenance of the 300 additional beds for the Royal Infirmary an annual sum of £30,000 would be required, and the endowment requisite to provide this £30,000 would, at 5 per cent. interest, amount to £600,000. It follows, therefore, that for the transference, extension, and maintenance of the new infirmary a sum of about a million sterling (£360,000 capital expenditure and £600,000 endowment) would have to be raised, quite apart from all the existing assets of the Infirmary, together with the maintenance of voluntary contributions at their present level. It is not inconceivable that such a sum could be raised for Aberdeen by a world-wide appeal, but it does not seem in the slightest degree feasible that such appeals for voluntary contributions would provide the funds to meet the hospital inadequacy of the country generally. This problem of maintenance is equally giving grave concern to the Directors of the Sick Children's Hospital. By means of intensive methods the Directors have raised some £100,000 for the new hospital, and of this sum it is considered that about £60,000 at the most can be made available for capital expenditure, having regard to the increased maintenance expenditure that the new hospital will necessarily incur. The intention is to build at present 128 beds, which, at £600 per bed, will cost £76,800, thus leaving the new buildings in debt to the extent of £16,800; and the number of beds to be provided is limited by these considerations of finance, since it is generally admitted that the provision of 150 to 200 beds instead of 128 beds would be no more than a reasonably adequate provision. With reference to a new Maternity Hospital of 50 beds, there does not appear to be any prospect of raising money by voluntary means for more than 20 beds, and, accordingly, the remaining 30 beds will have to be provided and maintained by the Town Council under the Council's Scheme of Maternity Service and Child Welfare.

It is necessary to point out at this stage that no financial relief, of any importance to the voluntary hospitals, is to be anticipated by requiring payment in whole or in part by patients for maintenance. Partial payment for maintenance, but of an insignificant description, has for long been in force in Aberdeen Royal Infirmary, where the patients' relatives are encouraged to supply eggs, butter, &c., required by the patient. In view of modern knowledge of nutrition it will be recognised that the stage has been long since passed where the dieting of the sick can properly be left dependent on such fluctuating supplies. So also partial payments of a much more comprehensive nature are required from mothers under the Town Council's Maternity and Child Welfare Scheme in regard to residence in the Mothers' and Babies' Homes and Day Nursery, and it is well known to the Maternity and Child Welfare Medical Officer and myself that the sum obtained in this way (never exceeding £500 per year) is altogether insignificant as compared with the work of collecting it and with the total expenditure on the service (£10,500). Information is not available in Aberdeen to indicate the nature or the extent of the contributions that might be made by insurance societies towards financing the extension of the hospital system. If insurance funds are to be made available to meet the requirements of an adequate hospital service, then the contributions from such funds would require to be made compulsory, permanent and adequate in amount. Taking all these considerations together, it would appear to be abundantly demonstrated that the provision of adequate institutional health services in Aberdeen must wait until such time as the State, or Local Authority, or insurance societies become responsible for deficiencies in the hospital accounts.

Co-ordination and Administration of Health Services.

Reference has already been made to the admitted need for unification of the public medical services as set forth in the Board of Health Report on a Reformed Local Authority for Health and Public Assistance by the Consultative Council on Local Health Administration and General Health Questions, and, accordingly, the advisability of securing such unification need not be further considered here. With regard to utilising available accommodation at Oldmill Parish Hospital, I may be permitted to state here that I have recently visited Oldmill with a view to again considering whether it could not be utilised as a nucleus for the proposed joint hospital. Oldmill was built for a specific purpose, namely, for a poor-law institution, and it admirably serves that purpose; but for the purposes of a modern hospital the main part of the institution, costing about £100,000, could only be utilised for administrative purposes, and could not readily be modernised to accommodate patients. Even if it were considered wise to cut the loss and utilise the main building for administrative purposes, the lie of the surrounding land is not best suited for the lay-out of such a hospital as the Joint Hospital Scheme implies.

When consideration is given to the matter of co-operation between the medical services for which the Town Council are responsible and the medical services provided by the voluntary hospitals, then questions relative to the nature and extent of this co-operation at once emerge. These questions relate to the direction and control of such joint services, to the financing of them, and to their adequacy.

It may be said at once that Aberdeen Town Council, having in view the enormous commitments they have to face in connection with the functioning and expansion of the health services for which they are at present responsible, have no desire to interfere in any way with any voluntary medical agency that is adequately serving its purpose. Not only so, but the financial responsibility of the Town Council for their municipal health services is at present so great that they will have the utmost reluctance in assuming financial responsibility for medical services beyond the scope of their present activities, and then only when the necessity for doing so is abundantly proved. This point wants further elaboration.

Thus, when the necessity for the transference or extension of any main voluntary hospital has been fully demonstrated there is every reason to believe that the Town Council concerned, having regard to the usefulness of the work of the voluntary institution in their area, would give any application for assistance in such transference and extension the most sympathetic consideration and might see their way to give a substantial donation and perhaps even a very large donation to the building funds of such an institution. But such a gift, even of a very large sum, is a wholly different thing from assuming responsibility for maintenance costs, which would commit a local authority to annual disbursements for all time to come. This pledging of the credit of future Town Councils and of future generations of citizens can only properly be undertaken after consent has been given to such control of the expenditure as would satisfy the contributors that the money was being spent in the best possible way. In other words, it does not seem proper that an existing Town Council should sign away the power to control expenditure which is the heritage of the citizens. I am well aware that this point of view is not endorsed by many distinguished administrators to whose opinion every consideration and respect must be paid. On the contrary, the view has been expressed that governing bodies are more efficient when they are composed in the main part of individuals having special knowledge of and interest in the service concerned. And while this view has been endorsed to a certain extent by legislative enactment, viz., the Blind Persons Act, 1920, which gives power of co-option to statutory committees, it was never intended that such co-opted persons would be more than advisers, nor that they should assume the power to determine the extent and nature of financial commitment. Public opinion has advanced far beyond the stage where the expenditure of money raised by local rates can properly be left to the discretion of a directorate the members of which are not required to face the regular ordeal of popular election. Not only so, but it very often happens that the person with special knowledge or interest in a particular health service is actively employed in the functioning of the service, and his pleading in the matter is almost inevitably regarded as biased. In this connection, it frequently happens that the individual with expert knowledge can more profitably make his knowledge available to the popularly elected committees concerned without necessarily being co-opted on the committee at all. Further, and more frequently than is generally understood, the person who is assumed to have special knowledge of health services has only very limited knowledge, and, in consequence, is too apt to base his conclusions on that limited knowledge rather than to give full consideration to all the facts as set forth for the guidance of public bodies who, with the facts before them, exercise their judgment in a systematic and business-like way.

At this stage it is important to turn to the experience of Aberdeen Town Council in contracting out or farming out certain of their health services to the Directors of voluntary institutions. It would be an easy way out for any Local Authority to contract out their health work to a medical agency and to make payment without regard to the efficiency of the service so long as the charges were not excessive, were it not that by doing so the Local Authority would be evading entirely the duties imposed upon them by the various statutory enactments and regulations. The hopeless inadequacy of Aberdeen's venereal disease service is fully set forth in the Report on the Municipal Health Services, and need not be further elaborated. The arrangement by which the Town Council contracted out the main institutional part of the ante-natal service has also been described in the Health Services Report, and the inadequacy of this ante-natal provision with its stultifying effect on all the other activities of the Maternity and Child Welfare Service is abundantly proved by the documentary evidence which is herewith submitted. It is necessary to repeat that the personnel engaged in carrying out the venereal disease work and the ante-natal work are not responsible for the disappointing results obtained. The activities of these clinicians are largely devoted to other departments of service, and are almost necessarily concerned more with problems of treatment and cure than with matters of prevention. It is necessary to point out also that it is in no way contended that the existing voluntary services cannot undertake a part—and possibly a very important part—in the work of any of the municipal services. Indeed, in centres larger than Aberdeen, it may be found that the best method of overtaking the work is to utilise in the fullest fashion the services of the voluntary institutions as part of a comprehensive municipal service; but the limited field of curative medicine within which the voluntary institutions mainly operate gives them neither time nor opportunity within which to measure the necessity for the application of preventive measures or to determine the efficacy of the preventive services when applied. Having regard to the size of Aberdeen, it is improbable that the Town Council will be able to afford to duplicate its institutional health services by paying a voluntary hospital to do part of the work and at the same time maintaining a municipal institution to complete the work and make it comprehensive. The more experience is obtained of the functioning of the municipal health services in Aberdeen, the more does it become apparent that they can serve the purposes for which they were designed only when the arrangement is such that the administration and methods of functioning are directly subject to the control of the Local Authority.

If the point of view be accepted that it is necessary for purposes of efficiency that the Town Council should have comprehensive control of the administration and direction of any health service for which they are directly responsible, and that in the event of their undertaking any of the main financial responsibilities of a voluntary institution they should have representation on the Managing Committee of the institution concerned commensurate with the financial commitment involved, and if it be granted that there is a necessity for the fullest co-operation between all the health services, voluntary and statutory alike, then consideration falls to be given to the machinery that can secure the best results. The organisation of the Health Departments of Local Authorities provides the only existing machinery for measuring the needs of each of the health services and their relative importance. An extension of this machinery, which a wider field of work would imply, could be immediately secured at an insignificant cost. Recognition of the desirability that the existing machinery of health authorities should be utilised for this extended purpose is to be found in the Draft Memorandum of Evidence proposed to be placed before the Royal Commission on National Health Insurance by the British Medical Association. In the scheme outlined in that evidence it is contemplated that the Medical Officers of Health should be the Administrative Officers, and that the Insurance Committees should be absorbed in the Town or County Councils. This draft scheme of a national insurance service, abolishing pauper disqualification and embracing dependents, has been prepared not by public health officials but by the elected representatives of the medical practitioners of the country, and it is suggested that when the medical profession are prepared to accept such administrative services, then there can be nothing fundamentally derogatory in the directorates of voluntary institutions similarly utilising them.

Even when convinced of the necessity, it will require a great generous gesture on the part of the Local Authorities to undertake their part of the financial responsibilities that are implied in the provision of adequate health services for the community, and similarly a great generous gesture will be required of the directorates of voluntary hospitals if the administrative machinery that efficiency implies is to be secured.

There is, of course, the alternative of leaving the voluntary institutions to function uncontrolled and inco-ordinated, subsidised by imperial grants and aided by whatever donations Local Authorities may in their wisdom provide; but such an arrangement, apart altogether from the lack of comprehensiveness in the health service thus provided, means the perpetuation of the system of divided health services identical with the division that at present exists between the medical services of Town or County Councils and Parish Councils —a division of services that the present Government would appear to be desirous of terminating.

Medical Education.

The provision already being made for the accommodation within the Fever Hospital of an increasing number of acute diseases is already seriously detracting from the usefulness of the Royal Infirmary as the main teaching hospital of the medical school. This dearth of acute medical diseases in the chief teaching institution in Aberdeen has not yet made itself felt in the teaching hospitals serving larger centres of population, but it is only a matter of time until it manifests itself in every teaching centre. Such an arrangement of medical institutions on a common hospital site as has been indicated in the Health Services Report would provide a medical unit which would embrace both the medical wards of the Royal Infirmary and the infectious diseases wards of the Municipal Hospital, including the pulmonary tuberculosis wards and the venereal wards, and would provide a comprehensive medical unit for purposes of medical education.

Home Nursing Services.

It is generally admitted that a large extension of home nursing services is essential to an adequate health service, and there is no prospect of voluntary effort alone meeting this requirement.

Increase of Powers and Resources.

(1) No increased powers would appear to be required in connection with the existing municipal health services, the powers contained in the existing enactments and regulations being in advance of the provision made by Local Authorities. In this connection, it is suggested that it would be a mistake to exercise the powers contained in the Infectious Diseases Notification Act, 1889, with a view to making venereal diseases compulsorily notifiable. Optional notification of venereal diseases by medical practitioners should at most be sanctioned.

(2) Unification of the public medical services would appear to be one of the most immediately pressing of health reforms.

(3) If an adequate health service is to be secured, it would appear that powers must be obtained for providing municipal hospitals for general illness.

(4) If an adequate health service is to be secured, it would appear that greatly increased State grants must be provided.

(5) If the administration of the health service is to be sound and if full co-operation between the different health agencies is to be secured with a view to providing an adequate health service, the financing of the extended services, whether from insurance funds or Treasury grants, should be made through local health authorities and not by State subsidies to voluntary institutions.

Finally, while the need for the unification and extension of the public medical services may be regarded as proved, such a reform should not limit the scope of the essential services which individuals and voluntary organisations can best provide. Much of our social improvement has had voluntary beginnings, the State lagging behind until the work promised success or its success was demonstrated. To make these experiments and to make such demonstrations is the chief rôle of voluntary organisations; and the highest good of a voluntary worker is to have his work embodied in an official organisation. This immolation of voluntary work is never complete, for two reasons:—First, the official organisation is controlled by elected or co-opted unpaid workers; and, second, the transfer leaves the voluntary organisation free to start further social experimentation for the promotion of the communal welfare. This point of view is admirably set forth by Sir Arthur Newsholme in his book on The Ministry of Health (Whitehall Series, Putnam, 1925).

ABERDEEN BURGH INSURANCE COMMITTEE.

The Burgh Insurance Committee are similarly engaged in exploring every avenue that may lead to the mitigation or removal of the unsatisfactory conditions that are occasioned by the present shortage of hospital beds in Aberdeen, and the *interim* report of the Insurance Sub-Committee, dealing with their inquiries, is available elsewhere. Meantime it would appear that the Insurance Committee have failed to devise means for increasing hospital facilities with a view to shortening the period of waiting for admission which the existing lack of accommodation necessitates.

RATING AND VALUATION BILL.

Recently the Minister of Health has formally introduced to Parliament the Rating and Valuation Bill which was promised in the King's Speech, and the Government hope that it may be possible to pass it into law before the close of the present session. The Bill has application only to England and Wales, but it is understood that a separate measure for Scotland is in active preparation. Under the Bill, parochial rating is to disappear, and if the Bill takes effect the Parish Council will give place to the Town Council, which will levy a "general rate" in place of the existing separate rates. As a natural sequence all the functions of the Parish Council will be transferred to the Town Council.

Should a similar Rating and Valuation Bill for Scotland take effect, then it would follow in due course that Oldmill Hospital would be transferred to the Town Council. Oldmill Hospital was built 18 years ago at a cost of £126,000, and the present debt on it is £60,600. In view of the fact that there are some 400 vacant beds in Oldmill Hospital, such a transference of Oldmill Hospital to the Town Council would have an important bearing on the whole question of hospital provision, and would require to be taken into consideration by the Council in determining future hospital policy.

Meantime it may be said that the urgency of the need for a re-arrangement and extension of the hospital accommodation in Aberdeen can scarcely be exaggerated.

CITY HOSPITAL SERVICES.

The concentration of the chief municipal health institutions within the City Hospital is an ideal arrangement for the co-ordination of the work. At the City Hospital there are the fever wards, the tuberculosis wards, the children's ward for wasting infants, the skin and cleansing department, the tuberculosis dispensary and X-ray department, the venereal disease sub-centre, and the bacteriological and chemical laboratories of the City. These institutions are the centre of investigation into every department of hygiene, sickness, and death, and their concentration on one site permits of team work under the best conditions. It will be obvious, therefore, that the City Hospital services permeate every department of municipal health activity, and that the substance of the Report of the Medical Officer of Health is largely based on the work carried out at the Hospital. A measure of the extent of the work undertaken at the Hospital during the year is to be obtained from the Report as a whole, and, accordingly, under the heading of "City Hospital Services" it is sufficient to refer briefly to the cases admitted to the hospital for treatment.

During the current year Mr. John Stevenson Taylor, M.B., D.P.H., was appointed Senior Resident Medical Officer at the City Hospital and an Assistant Medical Officer of Health of the City, and during the year also the organic association between the Public Health Departments of the University and the City was strengthened by the appointment of Mr. Douglas Wales Berry, M.C., M.D., D.P.H., Lecturer in Public Health, Aberdeen University, to be in addition an Assistant Medical Officer of Health of the City.

The admissions to the City Hospital during 1924 are shown in Table IX. The total admissions amounted to 1,293, as compared with an average of 1,743 during the 1914-1923 decennium, which embraces the years of epidemic prevalence of scarlet fever and diphtheria.

The daily number of patients under treatment varied from 165 to 260, the average daily number being 189.

Considerable experience has been obtained during the year in the nursing of all kinds of infectious diseases in the open air, and all the experience gained so far indicates that there is no infection which fails to benefit greatly by open air treatment under controlled conditions. Unreliable results continue to be obtained in the treatment of scarlet fever, erysipelas, and puerperal fever, with the various antistreptococcic sera as placed on the market. Sufficient laboratory work has been done to indicate the great complexity of the problems that have to be solved in connection with the production of toxin and antitoxin by the streptococci.

SMALLPOX.—One case of this disease, ending in recovery, was admitted to the City Hospital in November. The patient had contracted infection in Yorkshire. Details of the case appear in Chapter I. of this Report.

CHICKEN-POX.—Twelve cases were admitted to hospital. As was to be expected, no deaths from this disease occurred.

TABLE IX.—ABERDEEN.—CITY HOSPITAL.—ANNUAL SUMMARY.

†ADMISSIONS AND DEATHS DURING EACH YEAR FROM 1914 TO 1924 INCLUSIVE.

DISEASE.		1924	1923	1922	1921	1920	1919	1918	1917	1916	1915	1914	1914-1923.	
													Total	Annual Average
Small Pox,	Admitted, ...	1	1	0	0	0	0	8	0	0	0	6	15	1·5
	Died, ...	0	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*1*	1	0·1
Scarlet Fever, ...	Admitted, ...	186	238	272	538	375	247	204	245	812	1267	1040	5238	523·8
	Died, ...	4	*4*	*6*	*6*	*7*	*4*	*2*	*8*	*22*	*94*	*52*	205	20·5
Diphtheria,	Admitted,	282	185	287	684	536	533	348	327	553	618	1473	5544	554·4
	Died, ...	11	*8*	*14*	*35*	*28*	*29*	*19*	*18*	*32*	*40*	*117*	340	34·0
Typhus Fever, ...	Admitted,	0	0	0	0	0	0	0	0	0	0	0	0	0
	Died, ...	0	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	0	0
Typhoid and Para-Typhoid Fever,	Admitted, ...	10	23	9	6	7	22	104	1	10	13	12	207	20·7
	Died, ...	1	*3*	*0*	*0*	*2*	5	*14*	*1*	*2*	*1*	*2*	30	3·0
Acute Polio-myelitis,	Admitted, ...	3	0	7	4	3	1	1	9	69	0	0	94	9·4
	Died, ...	0	*0*	*0*	*2*	*0*	*1*	*1*	*0*	*2*	*0*	*0*	6	0·6
Cerebro-Spinal Meningitis	Admitted,	4	6	3	5	5	15	7	1	5	15	0	62	6·2
	Died, ...	3	*3*	*2*	*3*	*1*	*11*	*7*	*1*	*2*	*11*	*0*	41	4·1
Acute Pneu-monias	Admitted,	69	24	52	24	44	2	...	...	...	...	...	...	...
	Died, ...	9	*3*	*14*	*10*	*9*	*1*	...	...	...	...	...	...	..
Erysipelas,	Admitted, ...	15	22	32	37	40	16	17	13	9	2	22	210	21·0
	Died, ...	3	*0*	*4*	*3*	*4*	*1*	*2*	*1*	*1*	*0*	*2*	18	1·8
Puerperal Fever, ...	Admitted,	11	8	4	7	9	4	4	2	3	1	4	46	4·6
	Died, ...	3	*3*	*1*	*2*	*3*	*1*	*2*	*1*	*0*	*0*	*1*	14	1·4
Measles, ...	Admitted, ...	96	49	209	1	52	24	112	166	7	58	1	679	67·9
	Died, ...	11	*11*	*39*	*0*	*6*	*0*	*4*	*11*	*0*	*8*	*0*	79	7·9
Whooping Cough	Admitted,	91	0	32	5	6	21	18	17	2	4	0	105	10·5
	Died,	18	*0*	*10*	*0*	*2*	*2*	*4*	*3*	*0*	*0*	*0*	21	2·1
Tuberculosis	Admitted,	260	275	313	320	287	353	375	391	317	275	201	3107	310·7
	Died, ...	47	*47*	*50*	*42*	*47*	*76*	*78*	*69*	*56*	*43*	*28*	536	53·6
‡Ailing Infant Wards	Admitted,	161	167	192	178	143	96	...	...	...	...	...	...	...
	Died, ...	44	*50*	*70*	*75*	*76*	*61*	.	.	...	...	.	...	
Other Cases,	Admitted,	104	136	140	118	135	209	243	116	40	52	36	1219	121·9
	Died, ...	17	*12*	*13*	*13*	*12*	*30*	*71*	*32*	*12*	*3*	*3*	201	20·1
Total Cases,	Admitted,	1293	1128	1552	1927	1642	1520	1441	1288	1827	2305	2795	17425	1742·5
	Died, ...	171	*144*	*223*	*191*	*197*	*219*	*204*	*145*	*129*	*200*	*206*	1858	185·8
Average Daily Number of Patients in Hospital, ...		189	180	198	261	255	231	222	201	276	270	274	..	237

† Including cases admitted from outside City. ‡ From 1917 to 1919, admissions to Ailing Infant Wards included in "Other Cases."

Scarlet Fever.—The number of cases of scarlet fever admitted was 186, as compared with an annual average of 524 during the preceding decennium. There were 4 deaths, giving a case-mortality of 2·2 per cent., as against an average of 3·9 per cent. during the 1914-1923 decennium. An account of the work done in connection with Dick testing and streptococcus toxin immunisation against scarlet fever is given in the section of this Report dealing with infectious diseases.

Diphtheria.—Of this disease, 282 cases were admitted during the year, as compared with an annual average of 554 during the preceding decennium. The deaths numbered 11, the case-mortality being 3·9 per cent., as compared with an average of 6·1 for the 1914-1923 decennium. Other things being equal, the diminution of mortality from diphtheria is directly dependent on the diagnosis of the disease in its earliest manifestations. An account of the work done in connection with Schick testing and toxin-antitoxin immunisation against diphtheria is given in Chapter I. of this Report.

Measles.—Of this disease, 96 cases were admitted to hospital, with 11 deaths, the case-mortality being 11·5 per cent. During the 1914-1923 decennium, the average annual number of cases admitted was 68, with 8 deaths, and a case-mortality of 11·6 per cent.

German Measles.—Three cases were admitted during the year. As would be expected, there were no deaths.

Whooping-Cough.—The admissions during the year numbered 91, with 18 deaths, giving a case-mortality of 19·8 per cent.

Acute Pneumonias.—During the year, 69 cases of acute primary and acute influenzal pneumonia were admitted for treatment, as compared with an annual average of 29 during the preceding quinquennium. A total of 9 cases proved suitable for serum therapy, being infections with Type I. pneumococcus. During 1924, 9 deaths occurred, as against an annual average of 7 during the preceding five years.

Tuberculosis.—During the year, 260 cases were admitted to hospital, as against an average of 311 during the 1914-1923 decennium.

Of the 260 cases admitted, all were cases of respiratory tuberculosis except 68. These cases of extrapulmonary tuberculosis consisted of 24 cases of tuberculosis of bones and joints, 11 cases of tuberculous meningitis, 17 cases of abdominal tuberculosis, 13 cases of tuberculous glands, and 3 cases of generalised tuberculosis. Of the 192 respiratory cases, 111 were males and 81 females, and of the other cases, 32 were males and 36 females.

The cases of respiratory tuberculosis discharged from the City Hospital during the year numbered 174. As to the condition on discharge, 74 per cent. had improved in general health, 78 per cent. showed an increase in weight, 14 per cent. showed an improvement in the lung condition, some 65 per cent. were considered by the Tuberculosis Officer as fit for work or school, and in 70 per cent. of the cases the pulmonary condition was stationary.

As to the presence of tubercle bacilli in the sputum of cases admitted, 35 per cent. were positive; and 29 per cent. of the patients had bacilli in the sputum on discharge.

MENINGOCOCCIC MENINGITIS.—There were 4 admissions, with 3 deaths, as compared with an annual average of 6 admissions and 4 deaths during the preceding ten years.

ACUTE POLIOMYELITIS.—Three cases were admitted during the year. There were no deaths.

EPIDEMIC ENCEPHALITIS.—Four cases were admitted, with 1 death. Reference is made to this death in Chapter I. of this Report.

TYPHOID AND PARA-TYPHOID FEVER.—There were 10 admissions, with 1 death, during 1924, as compared with an annual average of 21 cases and 3 deaths during the preceding ten years.

ERYSIPELAS.—Of this disease, 15 cases were admitted to hospital, with 3 deaths; the average annual number of cases admitted during the 1914-1923 decennium being 21, with 2 deaths.

PUERPERAL FEVER.—In 1924, 11 cases were admitted, with 3 deaths; the average for the preceding decennium being 5 cases and 1 death.

VENEREAL DISEASES.—During the year, 5 cases of syphilis and 9 cases of gonorrhœa were admitted for treatment.

MARASMUS WARDS.—There were 161 admissions, with 44 deaths.

CLEANSING BLOCK AND SKIN DEPARTMENT.—The joint arrangement between the Town Council and the Education Authority for the cleansing of verminous school children continues to be of the utmost value in reducing the incidence of vermin among the population, and full details of the verminous conditions among school children are to be found in the annual reports of the Chief Medical Officer of the Education Authority.

Table X. shows that during the year the number of verminous persons, whether members of families with children of school age or not, disinfested at the City Hospital Cleansing Department, was 502. This table also shows that a total of 346 persons were treated for scabies in the skin wards of the Cleansing Department.

TABLE X.—ABERDEEN.—CLEANSING STATION.—YEAR 1924.

	AGE GROUPS (years).				ALL AGES.
	0–5	5–15	15–25	25 +	
Verminous Persons Cleansed, .	86	190	82	144	502*
Scabies Cases Treated, . . .	38	162	64	82	346†
TOTALS, ...	**124**	**352**	**146**	**226**	**848**

* Including 26 Army Cases. † Including 5 Army Cases.

TUBERCULOSIS SERVICES.

Treatment of Tuberculosis—Biological Action of Light.

In the section of this Report dealing with Infectious Diseases, it has been shown that about 90 per cent. of all cases of tuberculous disease occurring in Aberdeen are due to the human type of tubercle bacilli, and that the remaining 10 per cent. of cases are due to bovine type bacilli. It has also been shown that, while the vast majority of cases of pulmonary tuberculosis are due to the human type of tubercle bacilli, both the human and bovine types of bacilli originate the extrapulmonary forms of tuberculosis, whose local lesions are found in glands, bones, joints, skin, meninges, kidney, and other individual organs, as the case may be.

SURGICAL INTERFERENCE.

The term "surgical tuberculosis" has been commonly used to designate the majority of the extrapulmonary forms of the disease. This term "surgical tuberculosis" arose out of the practice of applying surgical methods to the treatment of the local manifestations of the disease process.

It is now very generally acknowledged that much of the operative interference to which tuberculous processes were formerly subjected was largely unwarranted. It was due, in the main, to a failure to recognise that the so-called surgical lesions of tuberculosis were only local manifestations of a constitutional disease—the primary site of which is usually found in the lungs and lymph nodes. At the same time, the swift and radical measures that operative interference appears to imply were naturally attractive both to the patient and to the surgeon. On the other hand, it has to be borne in mind that the results that can be achieved in the treatment of the localised lesions of tuberculous disease by the application of sunlight therapy were largely unknown at the time when the surgical treatment of tuberculosis attained its greatest vogue. It soon became apparent, however, that the hope of extirpating tuberculous disease by operative interference was not to be realised. On the contrary, surgical interference destroyed the granulation tissue that protected the surrounding normal tissues, and so exposed new areas to infection. Surgical interference inevitably tended to sacrifice the function of the part. Surgery exposed the tuberculous patient suffering from the debilitating effects of a systemic disease to the shock and injury of an operation and to the possibility of secondary infections; and in the after-treatment, the tuberculous patient was subjected to the mental and physical depression that after-treatment within the wards of a city hospital implies.

The indiscriminate use of surgical procedure has now been abandoned and the *rôle* of surgery in tuberculous disease has now been confined to the correction of deformities, to the provision of stability in a flail and useless articulation, to the excision of the kidney in advanced cases of renal tuberculosis, and, in general, to dealing with local foci of infection in patients whose general physical condition has been fully established by a prolonged course of heliotherapy. In the vast majority of cases, surgical interference is confined to the aspiration of abscesses by puncture, or at most, by a small incision. It is in preventing and correcting deformities that orthopædic surgery finds its true field in tuberculosis work. This return to more conservative methods of treating cases of extrapulmonary tuberculosis has come about largely as a result of the scientific investigation of the effects caused by radiant energy on the human body, whether the energy emanates from the sun or from artificial sources. In fact, it may be stated that the truer appreciation that has been obtained of the effect of radiant energy on the human body as a result of scientific investigation, has provided a new therapy for tuberculosis and has opened up a fresh prospect of life and health for sufferers from tuberculous disease.

THERAPEUTIC AGENCIES.

It has long been recognised that the essential agencies in the treatment of all forms of tuberculosis are fresh air, sunlight, an adequate diet, and rest of body and mind, followed by graduated exercise, but it is only recently that sufficient knowledge has been made available to permit of some measure being made of the part played by each of these agencies in the treatment of the disease.

Thus, it is known that the benefit derived from fresh air depends mainly on the physical condition of the air as it affects the heat regulating mechanism of the body, and that changes of temperature, moisture, and movement of the air are all important. So also it has been ascertained that in a diet requisite to maintain health and increase resistance to disease, the presence of such vitamines as fat soluble A and water soluble B is as essential as are proteins, fats, carbohydrates and salts of an adequate nature and amount. The newer knowledge of nutrition is referred to at some length in the section of this Report dealing with metabolism and disease. So also there is much exact knowledge concerning the physiological response of the body to rest and exercise.

Most recently of all, the brilliant researches of Leonard Hill and his collaborators on the biological action of light have provided new knowledge of the part played by radiant energy in maintaining health and increasing resistance to disease. As a result of this most recent advance in knowledge, it is now possible to measure separately, and in a way previously impossible, the parts played by fresh air, sunlight, diet, rest, and exercise in securing human well-being, and to apply these immunising agencies to the treatment of tuberculous disease with new precision and greater effect.

PHYSICO-CHEMISTRY OF RADIANT THERAPY.

In order to understand light treatment it is necessary to have some knowledge of the action of the rays concerned, and the newer knowledge of the biological action of light as recorded by Leonard Hill may be summarised as follows:—

The heat spectrum including infra-red, visible and ultra-violet rays, extends from a wave-length of some 60,000 $\mu\mu$ ($\mu\mu = 0.000001$ mm.) to one of 100 $\mu\mu$. Beyond the outer dark heat rays are the Hertzian waves used in radio with wave-lengths extending to 1,000 metres or more. The inner dark heat rays merge into the visible which are of wave-lengths from 700 $\mu\mu$ (red) to 400 $\mu\mu$ (violet). Beyond the visible lie the invisible ultra-violet rays with wave-lengths from 400 $\mu\mu$ to 100 $\mu\mu$, and beyond these come the soft X-rays and then the hard X-rays and the γ rays of radium with wave-lengths so short as 0.01 $\mu\mu$.

The epidermis reflects and scatters rays which fall upon it, but some part of the visible rays penetrate and are absorbed by the blood beneath, warming it. The dark heat rays, on the other hand, absorbed mostly by the epidermis, warm it more than the blood in the dermis. The eyes are extremely sensitive to a narrow portion of the spectrum, namely the visible rays. The body is insensitive to Hertzian waves; their energy has to be converted into sound, and heard Likewise ultra-violet, X- and γ rays cannot be felt; a latent period of two or three weeks follows exposure to X- or γ rays before an erythema of the skin and irritation results. A latent period also follows exposure to ultra-violet rays, but one limited to hours. While the hard X-rays and γ rays and secondary rays started by these penetrate in part to deep tissues, the active ultra-violet rays are wholly absorbed by the epidermis and exert their effect there.

Both the heat rays and light rays, when intense enough to produce a lasting erythema, increase the haemo-bactericidal power of the blood as tested in vitro. Blood which before exposure to the rays killed, say, 80 per cent. of staphylococci mixed with it, two hours after a light bath sufficient to cause erythema killed 100 per cent. A similar result can be obtained by exposure to a mustard poultice sufficient to produce a permanent erythema.

It has been found that if a little blood is withdrawn from an animal, irradiated with ultra-violet rays by rotation in a quartz flask, and then put back again into the animal, this puts up the hæmo-bactericidal power, and yet the irradiated blood itself has this power actually destroyed in itself by radiation. The hæmo-bactericidal power depends on the corpuscles and not on the serum. Ferments, sera, agglutinins, and the anaphylactic power of blood are alike destroyed by ultra-violet radiation.

The heat rays and the visible rays have a local heating effect just beneath the skin, the visible rays having the greater heating effect, since there is greater absorption of dark heat by the surface layers of the skin and a deeper penetration of the visible rays. The heat rays and the visible rays have no effect on the skin apart from their heating effects and the erythema caused by heat. The ultra-violet rays, acting on the cooled skin, can produce delayed erythema and even blistering, followed by a long lasting brown pigmentation. Prolonged exposure to intense ultra-violet rays either of the sun or of an arc light, produces destruction and sloughing of the white skin. The ultra-violet rays having the maximal power of producing erythema, have a wave-length of 300-290 $\mu\mu$, just the region of the ultra-violet spectrum that comes through with the high sun on clear days. The active ultra-violet rays penetrate no further than the deeper epidermic cells. In them, the ultra-violet rays when absorbed produce profound atomic changes in the bioplasm, followed by chemical change in molecular structure which reaches such an irritative nature as to tend to dilatation of the subcutaneous blood vessels, exudation of lymph, increase of lymphocytes, and rise in the haemo-bactericidal power of the blood. Subsequent to these reactions there results desquamation followed by pigmentation. This pigment, melanin, which is formed in the skin after exposure to ultra-violet rays, acts as a screen and scatters and diffusely reflects rays.

While the visible rays, besides their heating effect, have no lethal effect on the normal living animal cells, it is easy to produce a most powerful effect from these rays by sensitisation of the cells. Many fluorescent dyes have this effect, eosin, erythrosin, &c., forming a compound with the bioplasm and so making the latter absorb and be affected by rays longer than the ultra-violet. The most interesting sensitiser is hæmatoporphyrin, an iron-free derivative from hæmoglobin, closely allied to phyloporphyrin, a derivative of chlorophyll. Traces of porphyrin are present naturally in the body, and in some rare individuals there is an excess endowing them with an unfortunate sensitivity which causes skin eruptions, and even ulceration of extremities on exposure to bright light—a disease called hydroa æstivalis. So far no clinical application of this sensitisation of the cells is available.

Ultra-violet rays can gravely injure the cornea or lens of the eye, but the rays do not penetrate to the retina, and when the retina is damaged by over-exposure to an arc light or to sun, it is injured by excess of visible rays acting on its extremely sensitive substance. Sunstroke due to local heating of the head, is possible in this country only on a few hot summer days. Heat-stroke from exhaustion of sweating in warm stagnant air is much more common. It has been proved that the bactericidal action of light is due to ultra-violet rays alone, and since these rays are all absorbed in the epidermis, they can only kill surface bacteria. Even in lupus they do not kill—they act by increasing the immunising powers of the tissues.

MEASUREMENT OF THERAPEUTIC ACTION OF ULTRA-VIOLET RAYS.

The therapeutic action of ultra-violet rays is meantime measured (1) by the lethal dose for infusoria, (2) by the erythema producing dose for the skin of an average white arm, and (3) by the rate of bleaching of a standard solution of acetone and methylene blue. In the Acetone Methylene Blue Gauge, or Actinometer, the standard solution of acetone blue has been standardised against the lethal dose for infusoria and the erythema dose for the skin, and each degree on the scale is twice to four times that required to produce a moderate erythema. In the Actinometer, the acetone blue solution is exposed in a quartz tube of standard diameter, and after exposure the degree of bleaching is determined by comparison with a set of blue tubes of depths of tint 10 to 3. The acetone solution absorbs the ultra-violet rays shorter than 360 $\mu\mu$, and the chemical reaction set up bleaches the blue. In this way observations can be taken with exposure to sun and to sky to show the intensity of ultra-violet radiation in clean air and the effect of smoke pollution. During a fine summer day the total reading may be above 20, in dull cloudy weather of winter, it may be 1 or 2, and in smoke polluted towns, 0. The total ultra-violet radiation from the sky is far more than from the direct sun. Smoke pollution cuts off half or more of the ultra-violet rays.

While the Acetone Methylene Blue Gauge can thus be used to measure roughly the ultra-violet radiation from the sun and sky, this apparatus as tested at the City Hospital has been found to be useless as an instrument of precision, the standard solution of acetone methylene blue being much too crude an indicator to measure with any accuracy the amount of the dose of ultra-violet rays. Experiments are meantime in process in Aberdeen to devise a photo-electric cell which will serve this purpose.

NEED FOR RESEARCH.

It is not suggested that the new knowledge of the biological action of light is in any way comprehensive. On the contrary, the profound effect of ultra-violet rays on bioplasm is only beginning to be appreciated and the work done is merely sufficient to indicate the complexity of the energy transformations that are induced by the absorption of ultra-violet rays by living cells. To what extent, if any, the activation of the trace of cholesterol in the epidermic cells is responsible for the profound body changes that follow irradiation is quite undetermined. It seems highly improbable that such activation will fully explain the general tissue changes. I have shown elsewhere that the ions in the atmosphere originating from the radio-active minerals in the earth are absorbed by those processes that vitiate air, and it is just conceivable that the ionic content of air has an influence on human metabolism, the subtile nature of which is at present wholly unappreciated.

VALUE OF IRRADIATION.

The clinical evidence of the value of heliotherapy is based on the extensive experience of Bernhard, Rollier, Gauvain, and others. There is now abundant clinical experience to show that heliotherapy is one of the most powerful remedies available for the treatment of the localised lesions of extrapulmonary tuberculosis. The effect of this remedial agency in increasing the bactericidal power of the blood and improving metabolism is also of great importance in the treatment of pulmonary tuberculosis. At Perrysburg, N.Y., Grasso has shown that great benefit can be obtained in the treatment of advanced and moderately advanced cases of pulmonary tuberculosis. Grasso does not recommend sun cure in acute tuberculosis and in pulmonary tuberculosis with high temperature due to acute complications such as pleurisy, pyopneumothorax, &c., and in cases with very recent hæmorrhage, but he does not consider a temperature of 100° or 101° F., hæmoptysis, chronic pleurisy and pyopneumothorax as contra-indications. Brilliant results have been obtained in pleurisy with effusion and in pyopneumothorax. It is found most beneficial in conjunction with artificial pneumothorax. The unfavourable results reported in pulmonary tuberculosis with heliotherapy are due to its improper application.

The benefits to be derived from sunlight treatment are by no means confined to tuberculosis. It has been shown in Chapter IV. that rickets can be cured by exposing the patient's body to natural or artificial sun baths, or by giving cod liver oil or certain foodstuffs activated by radiation. The experience of the war showed that light treatment is a powerful remedy for wounds. Chronic skin diseases, such as psoriasis, ichthyosis, eczema and boils, chronic anæmias of obscure origin, the debility following acute infectious diseases, nutritional weakness and wasting in infants and the fat-flabby condition of the sedentary middle-aged person should alike greatly benefit.

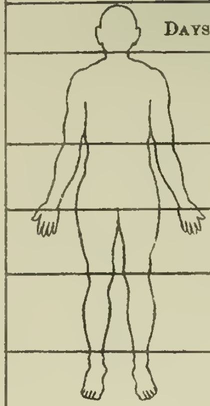
It is, however, as a preventive of disease, as a powerful stimulus to general health, and, in particular, to the defensive mechanism of the body to infection, that sunlight treatment has obtained its pre-eminence as one of the first prophylactic agencies at the service of mankind. The greatest benefit of sea-bathing can only be obtained by complete exposure of the greatest area of the skin of the body to the action of fresh air and sunlight. If mothers can be taught the need of exposing their infants' bodies to the sunlight; if they can be persuaded to take their children to the sea beach and city parks on bright summer days and allow them to disport themselves in the sunlight, clad only in a loin cloth (short bathing drawers are admirable for the purpose), and sandals; if they can find time in the dull, grey days of winter to bring their children twice weekly to the artificial sun baths at the City Hospital, where, stripped to the light rays, they will dance to music, they will provide a heritage of health for their children and be indeed thrice blessed. So also for adults. Health is a gay endeavour for every individual. It can be realised in a community organised for the purpose.

METHOD OF IRRADIATION.

Requirements of Helio-therapy.—The Rollier method of insolation is practised in Aberdeen with such modifications as the local climatic conditions have rendered advisable. There is no hard-and-fast technique. The regime is varied according to the physical condition of the patient, his susceptibility to sunlight, the nature of his lesion, and the intensity of sunshine. The patient is first accustomed to outdoor life before exposure to sun is started. The robust patient accustomed to outdoor life may be started at once in the warm weather, while the hectic, emaciated, bedridden patient must be slowly acclimatised. Grasso's modification of Rollier's method of insolation has been found a valuable guide, and his schematic diagram is reproduced here.

The patient about to be insolated lies in bed with his eyes protected by means of smoked glasses, the only clothes worn being a loin cloth, and he is covered with a sheet and blanket. On the first day the feet only are exposed and radiated for periods of 5 minutes three times during the day, at intervals of about an hour. On the second day the insolation period of the feet is increased to 10 minutes, and the lower extremities, from the knees to the ankles, for 5 minutes. On the third day the feet are radiated for 15 minutes at each period, the insolation of the legs is increased to 10 minutes, and the thighs are now exposed for 5 minutes. On the fourth day the entire lower extremities are receiving sunlight to the following extent—thighs 10 minutes, legs 15 minutes, feet 20 minutes; and the abdomen is now insolated for 5 minutes. On the fifth day the chest is now exposed for 5 minutes, the abdomen for 10 minutes, the thighs for 15 minutes, the legs for 20 minutes, and the feet for 25 minutes. Thereafter the periods of insolation are correspondingly increased 5 minutes each day until by the twelfth day the radiation period of the feet is one hour three times a day. From the twelfth to the sixteenth day the insolation period of the feet remains at one hour, the insolation of the other parts of the body being increased by 5 minutes each day, until each subdivision is receiving one hour insolation three times a day. On the seventeenth day the insolations are reduced to one morning and one afternoon period each of

GRASSO'S MODIFICATION OF ROLLIER'S SCHEMATIC DIAGRAM OF INSOLATION.

DAYS	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th	17th
					T I.D. 5 Min.	T.I D. 10 Min.	T.I.D. 15 Min.	T.I.D. 20 Min.	T.I.D. 25 Min.	T.I.D 30 Min.	T.I.D. 35 Min.	T.I.D. 40 Min.	T.I.D. 45 Min.	T.I.D. 50 Min.	T.I.D. 55 Min.	T.I.D. 60 Min.	B.I.D. *Full exposure as on the 16th day, only that the insolation is divided into a Morning and Afternoon Period of 90 min. each. This scheme is followed throughout the remainder of the cure*
				5 Min.	10 Min.	15 Min.	20 Min.	25 Min.	30 Min.	35 Min.	40 Min.	45 Min.	50 Min.	55 Min.	60 Min.	60 Min.	
			5 Min.	10 Min.	15 Min.	20 Min.	25 Min.	30 Min.	35 Min.	40 Min.	45 Min.	50 Min.	55 Min.	60 Min.	60 Min.	60 Min.	
		5 Min.	10 Min.	15 Min.	20 Min.	25 Min.	30 Min.	35 Min.	40 Min.	45 Min.	50 Min.	55 Min.	60 Min.	60 Min.	60 Min.	60 Min.	
	5 Min.	10 Min.	15 Min.	20 Min.	25 Min.	30 Min.	35 Min.	40 Min.	45 Min.	50 Min.	55 Min.	60 Min.	60 Min.	60 Min.	60 Min.	60 Min.	
TOTAL DAILY EXPOSURE	15′	30′	45′	60′	75′	90′	105′	120′	135′	150′	165′	180′	180′	180′	180′	180′	180′

DIVIDE THE TOTAL DAILY EXPOSURES INTO EQUAL AMOUNT OF INSOLATION TO THE ANTERIOR AND POSTERIOR SURFACES OF THE BODY WHEN POSSIBLE.

HOUR OF EXPOSURE	A.M.	8·45	8·45	8·45	8·45	8·45	8·45	8·45	8·45	8·45	8·45	8·45	8·45	8·45	8·45	8·45	8·45	8·45
	A M.	9·50	9·55	10·00	10·05	10·10	10·15	10·20	10·25	10·30	10·35	10·40	10·45	10·45	10·45	10·45	10·45	[illegible]
	P.M.	3·15	3·15	3·15	3·15	3·15	3·15	3·15	3·15	3·15	3·15	3·15	3·15	3·15	3·15	3·15	3·15	3·15

NOTE.—The above is the usual method to be employed unless contra-indicated by the general physical condition of the Patient, location of the lesion, and reaction to sunlight.

one and a half hours. This method of insolation can be readily followed from Grasso's diagram of insolation. If at any time the length of insolation is contra-indicated the time is shortened, or if the indications warrant, it may be increased to four hours per day by slow progression. The anterior and posterior surfaces of the body receive the same amount of sun treatment if possible, the total daily exposure being divided equally between the two surfaces. If by reason of his physical condition the patient cannot be turned to permit insolation of the posterior surface, the anterior surface alone is insolated and the time awaited until the physical condition will permit the turning of the body when the same procedure is repeated as outlined above. In the treatment of osteo-articular tuberculosis all plaster casts are discarded so that the sun may have access to the local lesions and immobilisation is secured by traction and sand pillows.

When heliotherapy was first put on its modern basis, doubts were expressed as to the possibility of its practical application in Aberdeen on account of the climatic conditions. The meteorological records for each month of 1924, and the average of the records for the preceding twenty-five years are set forth in the section of this Report dealing with atmospheric conditions, and it may now be said that the fears originally expressed have proved groundless. Heliotherapy can be used with a fair degree of regularity from the beginning of April to the end of October, and in no month of the year need it be entirely discontinued. The hideous smoke pollution of the air is nothing like so serious in Aberdeen as it is in the more intensely industrialised cities of the south, nor does mist obscure the sun to the extent it does on the west coast, but reference to the meteorological records makes it obvious that if the best effects are to be obtained from irradiation in Aberdeen, the deficiency in natural sunlight has to be made up by artificial sunlight, produced by arc lamps or mercury vapour lamps.

Requirements of Artificial Light Therapy.—In connection with the method of application of artificial light therapy, it seems well to sound a note of warning. In the treatment of tuberculosis, rickets, marasmus, and debilitating disease in general, by ultra-violet rays, the effects of the rays are enormously increased if the other environmental conditions are of the best description. There has been a general tendency to instal lamps for ultra-violet therapy in comparatively small, badly-ventilated rooms, where the patients radiated were confined to a vitiated atmosphere and without the possibility of obtaining exercise. Under such conditions it is not to be wondered at that treatment by means of artificial light has been regarded as an entirely inferior substitute to sunlight, and a treatment of questionable value. In all the circumstances as they exist in Aberdeen there is no doubt that the energy radiating from the sun gives the best effect when circumstances are favourable, but the value of artificial light as a substitute for sunlight in unfavourable weather can scarcely be exaggerated. *If, however, the maximum benefit of artificial light is to be obtained, it is necessary that all the other conditions should be made as nearly approaching the best summer time open air conditions as is possible.* Thus it is essential that the arc lamps or mercury vapour lamps should be installed in open air wards, and that the patients should be set in a happy environment and be imbued with a spirit of cheerfulness and optimism. To this end, two 75-ampere arc lamps in parallel with white flame carbons and four K.B.B. atmospheric mercury vapour lamps, all the lamps being suspended from the ceiling, have been installed in one of the main open-air wards at the City Hospital.

Adults as well as children, in so far as their physical condition permits, undergoing treatment by artificial light, should enjoy the rays and fresh air, an adequate diet, and exercise, just as they do under the best conditions of sun cure clinics; and one of the best ways in which the benefit of artificial light can be obtained is to dance to music round the powerful lamps from which the radiant energy is proceeding. Children of all conditions, and not only the tuberculous child, benefit enormously as a result of artificial light treatment. Artificial light treatment is one of the most powerful preventives of disease that has been made available, and the healthy, vigorous development of previously stunted children under this treatment is one of the best achievements of medical science.

The photographs which form the Appendix to this Report give a slight idea of what can be accomplished in the way of insolation in the somewhat variable climate of Aberdeen. The photographs were taken on 4th April, 1925. It has not been the experience in Aberdeen that chilling of the body results from the treatment so long as the open air conditions are regulated, and it has not been found necessary to use any extraordinary precautions to prevent breezes reaching the body, apart from such screening from the wind as the comfort of the patient indicates. The effect of light treatment on the general condition of the patients is most remarkable. The haggard and spiritless appearance gives way to an attitude of cheerfulnss and animation. The improvement in the general physical condition, and in the illness itself, is obvious to the patients themselves, who rapidly become contented and hopeful. The prophylactic properties of the rays are even more important than the therapeutic.

Additional Accommodation.

In view of what has been said of the modern treatment of tuberculosis, it will be obvious that the present Aberdeen Royal Infirmary can no longer be regarded as a suitable place for the treatment of any form of tuberculous disease.

The need for providing additional institutional accommodation for cases of tuberculosis is fully set forth in the preceding Report of the Medical Officer of Health. In the past the treatment of tuberculosis by fresh air, sunlight, diet, and rest followed by graduated exercise was largely a matter of empiricism, and in the absence of any measure of the effect of each of these agencies in the treatment of the disease, there was some justification in proceeding slowly with the provision of sanatorium beds until such time as inquiry and investigation, and the analysis of collected observation, provided sound conclusions for practical application. The recent work on the biological action of light, as above recorded, has so increased our knowledge and the corresponding benefits to be derived from institutional treatment, that the provision of adequate accommodation for tuberculous cases can no longer be properly deferred. At the City Hospital there are 125 beds available for all forms of tuberculosis, and it is estimated that 250 beds are required.

Tuberculosis Statistics.

There was a regrettable increase in the deaths from all forms of tuberculosis during the year, as compared with the preceding 3 years.

The deaths from respiratory tuberculosis in 1924 amounted to 143, as compared with 128 in 1923 and 143 in 1922.

The deaths from other forms of tuberculosis were 70, as against 68 in 1923 and 41 in 1922.

It is important to note that the increase of deaths from non-pulmonary forms of tuberculosis, which was noted during 1922 and 1923 has continued, the increase being mainly due, as in the former two years, to an increase in the number of cases of tuberculous meningitis, and, to a less extent, to an increase of tuberculosis of the intestines and peritoneum. Had deaths from these forms of tuberculosis remained at their former level then the curve of decline in all forms of tuberculosis, which had been continuous since 1866, would have been maintained. The view is now very generally accepted that the vast majority of cases of tuberculous meningitis originate from a pulmonary focus.

Table XI., as also the accompanying chart, shows the great fall in the tuberculosis death-rate during the past sixty odd years. The rapidity of the decline of the death-rate from respiratory tuberculosis, as represented by the slope of this line, in the accompanying diagram, shows that it has considerably slackened within the past fifteen years. The diagram also makes abundantly clear the fact of the much more rapid fall of the death-rate from other forms of tuberculosis in the earlier years of registration, as compared with later years, and as opposed to the past two years, when the rate has again risen to what it was during the 1916-1920 quinquennium.

Table XII. gives the number of tuberculosis cases notified during the year, divided into respiratory and non-respiratory cases, and arranged according to sex and age-period. It will be observed that while respiratory cases were most numerous at the age-period 15-45 years, and the non-respiratory at ages under 5 years, all forms of tuberculosis taken together and estimated per year of age-period, show, on the whole, a well-marked declension in prevalence as age advances. It will also be observed that the number of deaths per year of age-period during the year under review, is highest in the 0-5 age-period.

As regards the percentage of deaths to notified cases, the percentage was lowest in the 5-15 period, being 14 per cent., and highest at the period of 65 years and upwards, being 115 per cent.

It may be noted that the number of deaths at all ages from respiratory tuberculosis in relation to the number of notified cases was lower among males than among females, being 47 per cent., as against 54; while for other forms of

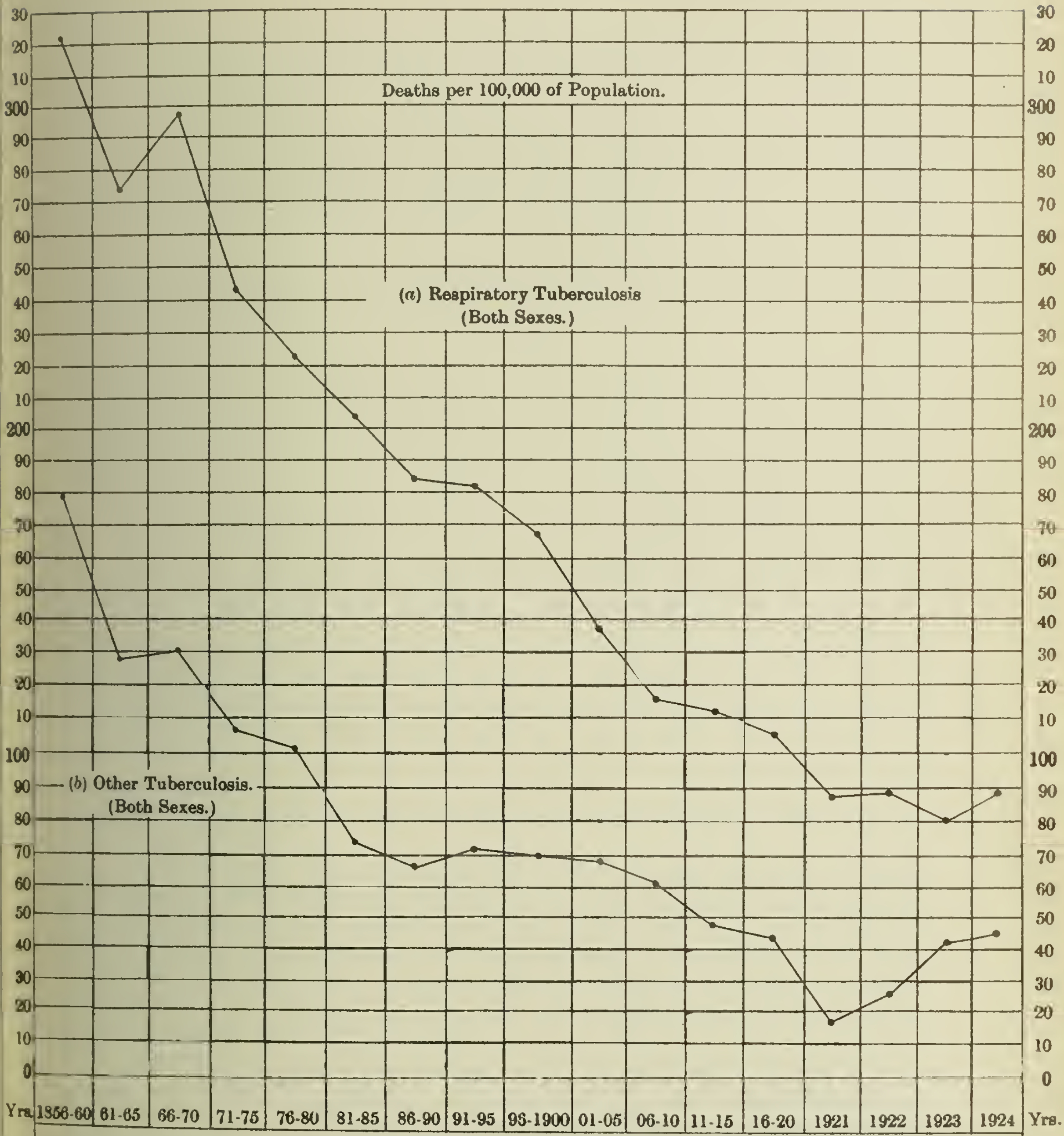
TABLE XI.—ABERDEEN.—MORTALITY FROM TUBERCULOSIS IN YEARS 1856-1924,* Per 100,000 of Population.

PERIOD.	RESPIRATORY TUBERCULOSIS.			OTHER TUBERCULOUS DISEASES.			ALL TUBERCULOUS DISEASES.		
	Males.	Females.	Both Sexes.	Males	Females.	Both Sexes.	Males.	Females.	Both Sexes.
1856-60	333	312	322	235	135	179	568	447	501
1861-65	267	279	274	158	103	128	425	382	402
1866-70	295	300	298	170	98	130	465	398	428
1871-75	234	250	243	129	89	107	363	339	350
1876-80	217	228	223	112	92	101	329	320	324
1881-85	189	216	204	90	62	74	279	278	278
1886-90	179	188	184	76	60	67	255	248	251
1891-95	179	183	181	83	62	72	262	245	253
1896-1900	166	168	167	77	64	70	243	232	237
1901-05	143	134	138	79	62	69	222	196	207
1906-10	119	113	116	74	51	61	193	164	178
1911-15	125	99	111	53	47	49	177	146	160
1916-20	104	107	106	49	39	43	153	146	149
1916	110	120	116	39	29	34	149	150	149
1917	132	102	116	67	49	57	199	151	173
1918	107	114	111	57	47	51	164	161	162
1919	95	82	88	50	37	43	145	119	131
1920	77	116	98	31	32	32	109	148	130
1921	81	95	88	18	16	17	98	111	105
1922	103	77	89	31	21	26	135	98	115
1923	106	57	80	53	33	42	159	90	122
1924	98	82	89	55	34	44	153	116	133

* Corrected for transferred deaths in 1904 and subsequent years.

ABERDEEN—TUBERCULOSIS, 1856-1924.—QUINQUENNIAL PERIODS.

ALL AGES. BOTH SEXES.



Yrs.	1856-60	61-65	66-70	71-75	76-80	81-85	86-90	91-95	96-1900	01-05	06-10	11-15	16-20	1921	1922	1923	1924
(a) RESPIRATORY TUBERCULOSIS.	322	274	298	243	223	204	184	181	167	138	116	111	106	88	89	80	89
(b) OTHER TUBERCULOSIS.	179	128	130	107	101	74	67	72	70	69	61	49	43	17	26	42	44

Deaths per 100,000 of Population.

(Corrected for transferred deaths in 1904 and subsequent years.

TABLE XII.—ABERDEEN.—TUBERCULOSIS CASES NOTIFIED IN 1924.

(Corrected for Transfers.)

AGE-PERIOD (Years).	Respiratory Tuberc.			Other Tuberc.			Total Cases.		Total Deaths.		Percentage of Deaths to Cases at each Age-Period.
	Males.	Females	Both Sexes.	Males.	Females	Both Sexes.	For Age-Period.	Per Year of Age-Period.	For Age-Period.	Per Year of Age-Period.	
Under 5 (*5 Years*), .	9	8	17	34	28	62	79	16	47	9	59
5—15 (*10 Years*), .	25	22	47	22	19	41	88	9	12	1	14
15—25 (*10 Years*), .	30	30	60	6	10	16	76	8	34	3	45
25—45 (*20 Years*), .	47	53	100	2	7	9	109	5	62	3	57
45—65 (*20 Years*), .	35	15	50	1	3	4	54	3	43	2	80
65 and above, .	8	3	11	1	1	2	13	...	15	...	115
ALL AGES, .	154	131	285	66	68	134	419	...	213	...	...
Cases per 100,000 of Sex Population	210	151	178	90	78	84	262	...	...	...	..
Deaths per 100,000 of Sex Population	98	82	89	55	34	44	133	...	...	...	...
Percentage of Deaths to Cases notified .	47	54	50	61	44	52	51	...	...	...	...

tuberculosis the percentage was distinctly higher for males than for females, being 61, as against 44.

It is, of course, to be understood that in any reference to number of deaths in relation to cases notified, the deaths in any one year are, in considerable measure, deaths of cases notified in previous years, and, further, that owing to the admitted incompleteness of the notification of tuberculous cases, which in their earlier stages are difficult to diagnose, the comparison of deaths with cases is subject to considerable qualification, although not altogether without value, when ages and sex are being compared within any one year.

As regards the SITE OF THE DISEASE, in the 134 cases notified as suffering from tuberculosis other than respiratory, 36 were suffering from abdominal tuberculosis, 33 from tuberculous meningitis, 14 from tubercle of bones and joints (including the spine), 39 from tuberculous glands (mainly cervical), and 12 from generalised and other tuberculosis (including 2 of lupus).

There were 17 deaths of abdominal cases, 34 of meningitic cases, 4 of cases of bones and joints, and 15 of other cases.

OCCUPATIONS.—The following is a summary of the occupations of the cases notified during the year under review. The numbers given have, of course, no value as an indication of the relative prevalence of the disease without information as to the number of persons engaged in each occupation. Moreover, even if these numbers were supplied—and they are obtainable from the census—they are in most instances too small to yield reliable statistical conclusions for a single year; but it may be said, speaking generally, that during 1924 labourers showed, among the males, the highest incidence.

ABERDEEN.—OCCUPATION OF PERSONS NOTIFIED AS SUFFERING FROM TUBERCULOSIS.

(a) Males.

	1924.	
	Respiratory.	Other.
Children under school age,	12	36
Children at school,	23	19
Engineer, &c.,	6	1
Labourer,	19	3
Millworker (including Combmaker),	6	1
Stonecutter or Mason,	4	—
Stonepolisher,	1	—
Clerk,	7	—
Joiner, Sawyer, Shipwright, Cabinetmaker,	4	1
Carter,	4	—
Tailor,	2	—
Painter,	2	—
Printer or Lithographer,	2	—
Other or no occupation,	55	5
No information,	7	—
Totals,	154	66

(b) Females.

	1924.	
	Respiratory.	Other.
Children under school age,	10	27
Children at school,	20	21
Wife or Widow,	60	11
Mill or Factory Worker,	9	2
Domestic Servant or Charwoman,	5	—
Dressmaker or Milliner,	4	—
Clerk or Typist,	2	1
Shop Assistant,	7	—
Fishworker,	5	2
Teacher or Student,	2	—
Laundry Worker,	1	—
Other, at home, or no occupation,	4	4
No information,	2	—
Totals,	131	68

Insured Persons (National Insurance Act).—Of the 285 cases of respiratory tuberculosis notified, 115 were insured persons, 84 being male and 31 being female. The notified cases of other forms of tuberculosis included 15 insured persons, 9 of whom were males and 6 females.

As stated in previous Reports, the Town Council have now assumed full financial responsibility for the treatment of insured tuberculous patients. The accounts for medical prescriptions and the prescriptions themselves are forwarded to the National Health Insurance Central Checking Bureau in Glasgow to be audited, and are thereafter submitted for payment to the Town Council. During the year, the number of such prescriptions passed for payment amounted to 1,712.

Food Supply.—During 1924, food, chiefly milk, was supplied to an average daily total of 51 patients.

Supervision of Cases.—The Tuberculosis Medical Officer had the assistance of three Tuberculosis Health Visitors or Nurses in the visitation and supervision of tuberculosis cases throughout the year.

Size of House and Density of Occupancy.—Table XIII. gives the number of cases occurring in houses of different sizes, along with the average number of inmates. In the case of respiratory tuberculosis, the average number of inmates, including the patient, varied from 3·2 in one-roomed houses to 6·5 in houses of five rooms and upwards. The average for houses of all sizes taken together was 5·1.

In the cases of other forms of tuberculosis, the average ran from 3·3 for one-roomed houses to 6·6 for three-roomed houses and 6·5 for houses of five rooms and upwards. The average for all houses was 5·5.

As regards the position of the tuberculous cases in relation to room and bed accommodation at the time of notification, it was found that of the 285 cases of respiratory tuberculosis, only 75, or 26 per cent., were occupying a separate bed in a separate room, and 31, or 11 per cent., had a separate bed but not a separate room. More that one-half had neither a separate bed nor a separate room.

Assistance in Payment of Rent.—In December, 1916, the Town Council voted £100 out of the Common Good for the purpose of assisting necessitous tuberculous patients to secure improved housing accommodation while suffering from tuberculosis. During 1924 one tuberculous patient received such assistance.

Loan of Beds.—In order to facilitate the separation of the patient from the other members of the household, 50 beds or cots, with the necessary bedding, were given on loan to needful patients. On the last day of the year, there were on loan 153 beds with bedding, as against 184 at the end of 1923. In addition, at the end of 1924, there were 18 sets of bedding on loan, as against 11 at the end of 1923. The loaned beds and bedding continue to be well cared for, and are nearly always returned in good and clean condition, subject to the unavoidable effects of ordinary use.

Institutional Treatment.—The table on page 124 contains information as to the number of cases that were admitted to indoor institutional treatment during

Table XIII.—Aberdeen.—Tuberculosis.—Size of House in relation to Notified Cases and Registered Deaths during 1924.

		1 Room.	2 Rooms.	3 Rooms.	4 Rooms.	5 Rooms and up.	Institutional or not stated.	Totals for 1924.	Corresponding Totals for	
									1923.	1922.
Respiratory Tuberculosis (Cases),	Male,	19	49	45	13	15	13	**154**	140	184
	Female,	23	46	38	14	5	5	**131**	124	169
Both Sexes,	Cases,	42	95	83	27	20	18	**285**	264	353
	Deaths,	14	52	37	18	18	4	**143**	128	143
Average Number of Inmates, including Patient,		3·2	4·8	5·8	5·0	6·5	...	5·1	5·0	5·1
Other Tuberculosis (Cases)	Male,	14	28	20	1	1	2	**66**	64	49
	Female,	6	29	20	8	3	2	**68**	70	56
Both Sexes,	Cases,	20	57	40	9	4	4	**134**	134	105
	Deaths,	9	26	28	4	3	...	**70**	68	41
Average Number of Inmates, including Patient,		3·3	5·5	6·6	5·5	6·5	...	5·5	5·5	5·1
All Houses in City at Census, 1921 Average Number of Inmates,		2·2	3·9	4·7	4·7	4·8	...	4·2	...	...

1924, or were in clinical institutions when notified. The number of cases for each institution is given, and a distinction is made between respiratory cases and cases of other forms of tuberculosis.

During the year, a total of 316 cases of all forms of tuberculosis were admitted to indoor institutional treatment, after deducting 32 cases that had received treatment in two institutions.

Of 221 respiratory cases treated, 64 were under ten years of age, 43 between ten and twenty years, 84 between twenty and forty years, and 30 above forty. Of other tuberculous cases, the numbers for the corresponding age-periods were respectively 58, 22, 11, and 4.

The average stay of the tuberculosis cases discharged during the year from the hospitals and sanatoria giving indoor institutional treatment was, in respect of respiratory cases, 129 days for the City Hospital, 51 days for the Royal Infirmary, 57 days for the Sick Children's Hospital, and 178 days for Newhills Sanatorium. As regards the cases of other forms of tuberculosis, the average stay was 81 days for the City Hospital, 40 for the Royal Infirmary, and 43 for the Sick Children's Hospital.

As to outdoor institutional treatment, 585 cases, all of which were of respiratory tuberculosis except 53, received treatment in the Tuberculosis Institute at the City Hospital.

TABLE XIV.—ABERDEEN—TUBERCULOSIS CASES—ROOM AND BED ACCOMMODATION AT NOTIFICATION.

Year.	RESPIRATORY TUBERCULOSIS.															OTHER TUBERCULOSIS.														
	Males.					Females.					Both Sexes.					Males.					Females.					Both Sexes.				
	Separate Bed.					Separate Bed.					Separate Bed.					Separate Bed.					Separate Bed.					Separate Bed.				
	and separate Room.	but not separate Room.	No separate Room or Bed.	Not stated.	Totals.	and separate Room.	but not separate Room.	No separate Room or Bed.	Not stated.	Totals.	and separate Room.	but not separate Room.	No separate Room or Bed.	Not stated.	Totals.	and separate Room.	but not separate Room.	No separate Room or Bed.	Not stated	Totals.	and separate Room.	but not separate Room.	No separate Room or Bed.	Not stated.	Totals.	and separate Room.	but not separate Room.	No separate Room or Bed.	Not stated.	Totals.
1924	40	17	84	13	154	35	14	77	5	131	75	31	161	18	285	7	22	35	2	66	10	14	42	2	68	17	36	77	4	134
1923	38	19	81	2	140	37	15	68	4	124	75	34	149	6	264	9	17	37	1	64	12	15	41	2	70	21	32	78	3	134
1922	43	26	101	14	184	24	13	115	17	169	67	39	216	31	353	4	14	24	7	49	6	12	34	4	56	10	26	58	11	105
1921	57	22	102	9	190	42	24	116	10	192	99	46	218	19	382	7	10	23	3	43	6	19	22	6	53	13	29	45	9	96
1920	59	23	98	12	192	58	19	109	11	197	117	42	207	23	389	11	14	33	8	66	9	23	41	6	79	20	37	74	14	145
1919	66	29	138	15	248	56	25	122	8	211	122	54	260	23	459	9	19	51	1	80	13	15	32	7	67	22	34	83	8	147
Aver. 1919-1923	53	24	104	10	191	43	19	106	10	178	96	43	210	20	369	8	15	33	4	60	9	17	34	5	65	17	32	67	9	125

TUBERCULOSIS CASES NOTIFIED AND RECEIVING INDOOR INSTITUTIONAL TREATMENT.

	1924.		
	Resp. Tuberc.	Other Tuberc.	Total.
City Hospital (Sanator. Wards and Shelters),	152	60	212
Newhills Sanatorium,	14	0	14
Parish Council Hospital,	3	1	4
Royal Infirmary,	13	10	23
Cults Convalescent Home,	1	4	5
Royal Hospital for Sick Children,	2	17	19
Eidda Home (for children),	0	1	1
Linnmoor Home, do.	46	10	56
Kingseat Mental Hospital,	4	0	4
Institutions not connected with city :—			
A. In Scotland,	5	2	7
B. In England,	3	0	3
Total admissions,	243	105	348
Deduct cases treated in two institutions,	22	10	32
	221	95	316

VENEREAL DISEASES SERVICES.

The Chief Treatment Centre under the Joint Venereal Diseases Scheme for Aberdeen City and the North-Eastern Counties continues to function in quite inadequate premises at Aberdeen Royal Infirmary. The extent of the failure of the Royal Infirmary Centre to provide the services for which it was established, and the nature and causes of that failure are fully set forth in the previous Annual Report of the Medical Officer of Health and in the special Health Services Report, and need not be recapitulated here.

With a view to the co-ordination of the work of the Chief Centre at the Royal Infirmary and of the Sub-Centre at the City Hospital, it was arranged with the approval of the Directors of the Royal Infirmary that the Junior Venereal Diseases Officer should attend weekly at the City Hospital Sub-Centre in order to supervise the diagnosis and treatment of cases there and arrange for the allocation of cases in general. This arrangement came into force on 1st June, 1924, and reference to the statistical data at the end of this section of the Report shows that a small beginning has been made to the resuscitation of this moribund Sub-Centre.

ATTENDANCES FOR TREATMENT.

During the year, a total of 474 new City cases attended for treatment at the Royal Infirmary, as compared with 460 in 1923. In all, 28 City cases were admitted for in-patient treatment in 1924, as compared with 22 in 1923. The total number of attendances of all City cases during the year was 23,861, as compared with a total of 21,286 in 1923. The post-war increase in the prevalence of venereal diseases which attained its maximum in 1920, as measured by the number of new cases attending at the Chief Treatment Centre, steadily declined until the year under review, when a small increase occurred. It has to be noted, however, that, while the number of new cases steadily increased until 1920 and thereafter declined, the number of attendances of patients at the treatment centre has risen continuously since the initiation of the scheme. This evidence of the fact that an increasing number of patients are recognising the need to continue attending for treatment until the cure of the disease is accomplished is distinctly gratifying. The result may depend in part on the system under which treatment defaulters are urged to renew their attendances. Failing response to the written communications of the clinical officers advising their return, defaulters are visited by health visitors or infectious disease inspectors from the Health Department with the same object in view.

DISTRIBUTION OF VENEREAL DISEASE.

A detailed analysis of all City cases of venereal disease attending at the Royal Infirmary during the three years 1921-22, 1922-23, and 1923-24, in respect of age and sex distribution and the social status of the patients, was undertaken with a view to obtaining some measure of the incidence of the disease in the community and of the social problems which accompany it. The results of the analysis of this material are of so little practical importance that it would serve no useful purpose to publish the detailed statistics.

The inquiry revealed the fact that during the three years a total of 20 cases of venereal infection, excluding congenital infection, had occurred in children under 16 years of age, and further investigation of these cases showed that in 4 cases the infection was contracted as a result of criminal assault.

It was found that there was on the average 1 case of syphilis to 2·5 cases of gonorrhœa in males receiving treatment, as compared with 2·4 cases of syphilis to 1 case of gonorrhœa in females. This means that if the ratio of cases of syphilis to cases of gonorrhœa in males, namely, 1 : 2·5, is to obtain in females, then the number of female cases of gonorrhœa at present seeking treatment will have to be multiplied sixfold. It is obvious, therefore, that the main mass of gonorrhœal infection in Aberdeen women meantime remains untreated, and I am satisfied that under the present arrangements female gonorrhœa never will be treated. To treat gonorrhœa in the male without making adequate arrangements for the treatment of the more limited number of female cases which are the reservoir of the infection is obviously a procedure inconsistent with the prevention of the disease.

As regards status, for purposes of this inquiry, males were grouped as (*a*) labourers, *i.e.*, persons engaged in unskilled labour in industries or transport, and including dock labourers and railway porters; (*b*) artisans, *i.e.*, persons (including foremen) engaged in skilled labour of any kind, including such persons employed in transport by road, rail, or sea; (*c*) commercial, *i.e.*, manufacturers and artisan masters and all persons engaged in buying and selling goods of any kind, including all managers, travellers, and clerks connected with all such manufactories, trades, and businesses; (*d*) professional, *i.e.*, the usual professional persons (including professional group in Census), also official and military groups, University students, training college students, bankers, insurance agents, and accountants; (*e*) other or no stated occupation. Females were grouped as (*a*) housewives; (*b*) domestic servants; (*c*) workers in workshops and factories; (*d*) saleswomen (including dealers); (*e*) dressmakers and milliners; (*f*) clerks and typists; (*g*) teachers and nurses; (*h*) other occupation; and (*i*) no stated occupation.

As regards men, it was found that of those employed (*a*) as labourers a yearly average of 8·7 per 1,000 were receiving treatment for venereal diseases at the Royal Infirmary centre; (*b*) as artisans a yearly average of 3·8 per 1,000 were receiving treatment; of those engaged (*c*) in commerce 3·0 per 1,000; and (*d*) in professional work 1·3 per 1,000. As regards women, it was found that (*a*) of housewives a yearly average of 2·8 per 1,000 married women were receiving treatment for venereal diseases at the Royal Infirmary Centre; (*b*) of domestic servants a yearly average of 2·1 per 1,000; (*c*) of factory workers 1·8 per 1,000; and (*d*) of saleswomen 1·5 per 1,000. The number of cases of venereal diseases in the remaining groups of women was too small to justify calculated rates.

It is a quaint reflection that the class of unmarried women who have been found to have the highest incidence of venereal infection as judged by attendance at the Royal Infirmary, namely, domestic servants, have also the best chance of marriage, as is shown by reference to the marriage statistics. These figures relating to status have, of course, no significance as an indication of the social distribution of venereal diseases which in their ubiquity are unparalleled by any other diseases. The figures are merely a measure of the type of person seeking treatment at the Infirmary Centre.

NOTIFICATION OF VENEREAL DISEASE.

During 1924, a very definite effort was made by the Scottish Committee of the National Council for Combating Venereal Diseases to influence the Board of Health to decree that venereal diseases should be made compulsorily notifiable in virtue of powers conferred on the Board of Health by Section 78 of the Public Health Act. To that end the Scottish Committee invited Local Authorities to ascribe to certain resolutions, including a resolution regarding the necessity of having venereal diseases made compulsorily notifiable, adopted at a conference of Local Authorities in Glasgow in March, 1923. In this connection, the following Report was submitted to the Public Health Committee:—

Report relative to the Notification of Venereal Diseases approved by the Town Council of Aberdeen on 19th May, 1924, and ordered to be transmitted to the Scottish Board of Health.

City Health Department,
41½ Union Street,
Aberdeen, 14*th May*, 1924.

To the Public Health Committee.

Gentlemen,

Venereal Diseases—Circular from National Council for Combating Venereal Diseases.

With reference to the circular from the National Council for Combating Venereal Diseases, dated 7th May, 1924, wherein it is suggested that the Local Authority should pass a resolution affirming the resolutions adopted at the Conference of Local Authorities held in Glasgow on 8th March, 1923, viz.:—

Resolution 1.—That, in the opinion of this Conference, the present law and machinery are inadequate to secure the proper control and treatment of venereal diseases;

Resolution 2.—That, in order to secure adequate control of venereal diseases (both acquired and congenital), it is essential that a system of notification should be introduced;

Resolution 3.—That it is essential every person suffering from venereal disease should be required by law to place himself or herself under treatment by a qualified medical practitioner, and to continue under such treatment until pronounced free of infection;

Resolution 4.—This Conference resolves that a deputation be appointed to submit the foregoing resolutions to the Scottish Board of Health, and to urge upon the Board the desirability of their taking such steps as may be necessary to have same carried into effect with the least possible delay,

I beg to report as follows:—

Notification.—These resolutions were considered by the Public Health Committee at their meeting on 11th April, 1923, and at that time the differences of opinion that exist in connection with the notification of venereal diseases were made apparent. In the resolutions originally submitted as a basis for discussion at the Conference in Glasgow on 8th March, 1923, the latter part of Resolution 2 was set forth in the following terms, namely, "that a system of *conditional* notification should be introduced," but at the meeting it was determined that the word "*conditional*" should be deleted, with the result that Resolution 2 now reads—"that a system of notification should be introduced."

The deletion of the word "*conditional*" would appear to have been required in order to meet the views of the advocates of *compulsory* notification, since reference to the National Council's circular indicates that Glasgow Town Council in their resolution submitted to the Scottish Board of Health state "that the time has arrived for the introduction of a system of *compulsory* notification."

I am clearly of opinion, however, that *compulsory* notification of venereal diseases would seriously detract from the considerable success that has been achieved by the modern venereal diseases service. It is well known that to secure the best results early treatment of these diseases is essential, and a system of *compulsory* notification would, I am convinced, lead to the concealing of venereal diseases at an early stage when they do not commonly cause obvious disability, with the result that they would only be notified at a later stage when disability has developed to such an extent that disease can no longer be concealed, and at a time when the possibility of cure is much more remote. Not only so, but it is in the early stages that these diseases are most infectious and are accordingly most liable to be transmitted to other persons.

I think it probable that if the word "*conditional*" with reference to notification had been allowed to remain, as in the resolutions submitted as a basis for discussion at the Glasgow Conference, and had it been clearly qualified to mean notification only of those cases of venereal diseases, attending at venereal disease centres or attending private practitioners, which failed to continue treatment at a time when they were actively infectious, such conditional notification being dependent entirely on the discretion of the medical practitioner, it would have been possible for the Committee to recommend that the resolutions be adopted. With such conditional notification, the Health Authority would obtain knowledge of infective cases refusing treatment and liable or actually known to be infecting other persons, and would be in a position to institute compulsory treatment and, if necessary, detention of such recalcitrant persons.

Trevethin Report.—The circular of the National Council for Combating Venereal Diseases refers to the Trevethin Report—a Report of a Committee of Inquiry on Venereal Diseases published by the Ministry of Health in 1923—and states that the Scottish Committee of the National Council for Combating Venereal Diseases undertook to consider whether a feasible scheme of special measures for specified areas such as was suggested in Clause 33 of the Report, might be devised. The circular goes on to state that the Scottish Committee fully discussed this proposition, but are satisfied that it is neither feasible nor practicable to formulate such a scheme. The terms of Section 33 of the Trevethin Report, however, are really in accordance with the views above expressed as permitting measures for dealing with defaulters or recalcitrant persons, and I venture to suggest that the Committee should not concur with the view expressed in this connection in the National Council's circular.

With further reference to the Trevethin Report, I take this opportunity of pointing out to the Committee that Section 28 of the Report suggests that in rural areas where clinics are not easily available panels of medical practitioners should be constituted through whom treatment could be provided; and I am of opinion that the provision of such panels would be a solution of certain existing difficulties in rural areas participating in the Provisional Scheme for Aberdeen and the North-Eastern Counties. I have further ascertained that such panels would meet with the approval of the officials concerned with the administration of the present scheme in certain of the rural areas. On 15th February, 1923, previous to the publication of the Trevethin Report, I submitted to the Scottish Board of Health a proposal for the establishment of such a panel in an area within the Aberdeen and North-Eastern Area, but, at that time, the Board did not see its way to sanction the suggested arrangement.

Recommendations.—I beg to recommend that the Committee should not affirm Resolution 2 of the National Council for Combating Venereal Diseases, and that they should not endorse the third paragraph of the National Council's circular relating to the impracticability of formulating a scheme for dealing with defaulters.

I am, Gentlemen,
Your obedient servant,
(Signed) J. Parlane Kinloch,
Medical Officer of Health.

In terms of the Minutes of Council of 19th May, 1924, the Town Council declined to affirm Resolution No. 2 before referred to, or to endorse the third paragraph in the National Council's circular; and ordered that the Minute of Council and relative report by the Medical Officer of Health should be transmitted to the National Council for Combating Venereal Diseases, and also to the Scottish Board of Health for their information.

Ophthalmia Neonatorum.

Ophthalmia neonatorum is referred to at length in Chapter I. of this Report. Cases of this disease properly come under the survey and control of the Mother and Child Welfare officials, and the Health Department keeps all such cases under review and arranges for expert ophthalmic services whenever required.

As has been pointed out under "Puerperal Fever" in the section of the Report dealing with infectious diseases, the recognition of gonorrhœal infection in expectant mothers at the seventh month of pregnancy, by means of routine urethral and cervical swabbings, would permit cases of gonorrhœa in expectant mothers to be treated prior to confinement, and would greatly diminish the incidence of grave ophthalmia neonatorum.

As has already been stated, a total of 69 cases was reported during 1924, as compared with an annual average of 63 during the preceding ten years. A case notified in June resulted in a corneal opacity of the left eye, with partial impairment of vision. There was complete recovery in all the other cases.

Venereal Disease Statistics.

The following statistical data of the incidence and treatment of venereal diseases, as measured under the Joint Scheme, are submitted for the year under review. The statistical data relating to work done in connection with venereal diseases at the City Hospital Sub-Centre are also submitted.

CHIEF TREATMENT CENTRE AT ABERDEEN ROYAL INFIRMARY.

Total Number of New Cases.

Year.	Whole Joint Scheme.											Aberdeen City Cases only.										
	Total.	Syphilis.		Gonorrhoea.		Soft Ch.		Mixed Infs.		Not V.D.		Total.	Syphilis.		Gonorrhoea.		Soft Ch.		Mixed Infs.		Not V.D.	
		M.	F.	M.	F.	M.	F.	M.	F.	M.	F.		M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
1924	**637**	**101**	**81**	**249**	**46**	**4**	**0**	**22**	**8**	**86**	**40**	**474**	**68**	**62**	**192**	**36**	**1**	**0**	**15**	**3**	**60**	**37**
1923	626	109	100	235	41	6	0	24	9	58	44	460	64	83	183	29	2	0	13	5	48	33
1922	677	139	91	240	49	4	0	21	13	77	43	469	85	69	174	30	1	0	15	6	56	33
*1921	711	256	151	263	41							539	173	107	221	38						
*1920	762	325	137	263	37							580	228	99	221	32						
*1919	648	280	92	240	36							512	204	71	205	32						
*1918	387	149	104	110	24							316	112	90	96	18						

In-Patient Cases.

Year.	Whole Joint Scheme.											Aberdeen City Cases only.										
	Total.	Syphilis.		Gonorrhoea.		Soft Ch.		Mixed Infs.		Not V.D.		Total.	Syphilis.		Gonorrhoea.		Soft Ch.		Mixed Infs.		Not V.D.	
		M.	F.	M.	F.	M.	F.	M.	F.	M.	F		M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
1924	**69**	**14**	**8**	**21**	**12**	**0**	**0**	**5**	**9**	**0**	**0**	**28**	**7**	**3**	**9**	**4**	**0**	**0**	**4**	**1**	**0**	**0**
1923	63	16	6	13	12	2	0	5	7	0	2	22	5	3	6	4	1	0	1	1	0	1
1922	54	10	9	13	10	0	0	1	9	0	2	16	2	4	6	2	0	0	0	1	0	1
1921	72	12	29	9	11	1	0	2	8	0	0	32	6	17	4	3	0	0	1	1	0	0
1920	56	15	15	17	4	0	0	2	3	0	0	18	4	5	6	1	0	0	2	0	0	0
1919	66	27	18	12	4	0	0	2	3	0	0	23	6	8	5	2	0	0	1	1	0	0
1918	45	11	10	7	6	0	0	4	7	0	0	22	3	6	1	4	0	0	2	6	0	0

Attendances of all Cases.

Year.	Whole Joint Scheme.											†Aberdeen City Cases only.										
	Total.	Syphilis.		Gonorrhoea.		Soft Ch.		Mixed Infs.		Not V.D.		Total.	Syphilis.		Gonorrhoea.		Soft Ch.		Mixed Infs		Not V.D.	
		M.	F.	M.	F.	M.	F.	M.	F.	M.	F.		M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
1924	**26,843**	**3,628**	**3,829**	**13,400**	**3,448**	**32**	**1**	**1,396**	**881**	**112**	**116**	**23,861**	**2,875**	**3,344**	**12,241**	**3,242**	**6**	**1**	**1,233**	**755**	**85**	**79**
1923	24,157	3,959	3,892	10,485	3,607	18	8	858	1,128	117	85	21,286	3,191	3,346	9,706	3,225	10	1	709	965	75	58
1922	23,415	4,485	3,366	10,878	2,586	14	0	998	892	126	70	20,550	3,670	2,832	10,054	2,176	9	0	930	727	96	56
*1921	18,413	3,697	2,211	10,548	1,957																	
*1920	14,231	2,764	1,461	8,753	1,253																	
*1919	10,658	2,184	1,224	6,355	895																	
*1918	5,784	1,337	1,229	2,514	704																	

Until 1922 all V D. cases were classified under either "Syphilis" or "Gonorrhoea."

† Until 1922 no separate record was kept of the attendances of City Cases.

LABORATORY EXAMINATIONS.

(a) Total Number.

YEAR.	WHOLE JOINT SCHEME.							*ABERDEEN CITY CASES ONLY						
	TOTAL.	Syphilis.				Gonorrhoea.		TOTAL.	Syphilis.				Gonorrhoea.	
		Wassermann.		Spirochete.		Gonococcus.			Wassermann.		Spirochete.		Gonococcus.	
		Pos.	Neg.	Pos.	Neg.	Pos.	Neg.		Pos.	Neg.	Pos.	Neg.	Pos.	Neg.
1924	**7,426**	**1,408**	**3,383**	**13**	**91**	**415**	**2,116**	**5,971**	**1,069**	**2,770**	**11**	**82**	**341**	**1,698**
1923	7,164	1,459	3,163	41	117	514	1,870	5,635	1,115	2,518	27	105	407	1,463
1922	6,336	1,128	3,211	54	129	415	1,399	4,869	862	2,544	34	115	312	1,002
1921	4,462	677	2,401	88	145	384	767							
1920	3,441	795	1,716	74	122	299	435							
1919	2,337	669	1,072	54	86	276	180							
1918	1,322	435	578	38	47	111	113							

(b) Included in the foregoing Table (a) are the following number of specimens sent by private practitioners.

YEAR.	WHOLE JOINT SCHEME.							*ABERDEEN CITY CASES ONLY.						
	TOTAL.	Syphilis.				Gonorrhoea.		TOTAL.	Syphilis.				Gonorrhoea.	
		Wassermann.		Spirochete.		Gonococcus.			Wassermann.		Spirochete.		Gonococcus.	
		Pos.	Neg.	Pos.	Neg.	Pos.	Neg.		Pos.	Neg.	Pos.	Neg.	Pos.	Neg.
1924	**702**	**155**	**261**	**3**	**6**	**58**	**219**	**478**	**82**	**152**	**3**	**6**	**48**	**187**
1923	749	119	321	1	15	80	213	519	62	196	1	15	69	176
1922	873	124	433	2	8	72	234	550	72	239	2	8	56	173
1921	741	114	387	10	16	49	165							
1920	768	187	407	7	17	48	102							
1919	463	146	227	7	10	27	46							
1918	251	73	105	4	11	21	37							

(c) Included in Table (a) are also the undernoted numbers of bodies of infants, mostly still-born (all from City) examined for Syphilis.

YEAR.	Number of Bodies Examined.	Number found to contain the Spirochete of Syphilis
1924	**65**	**3**
1923	65	7
1922	65	5
1921	56	14
1920	57	12
1919	43	7
1918	34	7

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* Until 1922, no separate record was kept of Laboratory examinations for City cases.

SUB-CENTRE AT ABERDEEN CITY FEVER HOSPITAL FOR TREATMENT OF CERTAIN CITY CASES.

TOTAL NUMBER OF NEW CASES.

YEAR.	TOTAL.	Syphilis.		Gonorrhœa.		Soft Ch.		Mixed Infs		Not V.D.	
		M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
1924	**56**	**6**	**11**	**16**	**18**	**0**	**0**	**1**	**2**	**0**	**2**
1923	8	3	4	1	0	0	0	0	0	0	0
1922	22	15	5	0	2	0	0	0	0	0	0
*1921	33	15	14	1	3						
*1920	157	67	45	26	19						
*1919	109	33	46	28	2						
*1918	129	53	51	23	2						

IN-PATIENT CASES.

YEAR.	TOTAL.	Syphilis.		Gonorrhœa.		Soft Ch.		Mixed Infs.		Not V.D.	
		M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
1924	**14**	**2**	**3**	**4**	**5**	**0**	**0**	**0**	**0**	**0**	**0**
1923	5	2	2	1	0	0	0	0	0	0	0
1922	10	4	4	0	2	0	0	0	0	0	0
1921	13	4	3	1	5	0	0	0	0	0	0
1920	38	12	4	1	19	0	0	0	2	0	0
1919	21	5	10	0	5	0	0	0	1	0	0
1918	8	4	4	0	0	0	0	0	0	0	0

ATTENDANCES.

YEAR	TOTAL.	Syphilis.		Gonorrhœa.		Soft Ch.		Mixed Infs.		Not V.D.	
		M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
1924	**1,144**	**59**	**81**	**362**	**556**	**0**	**0**	**1**	**82**	**0**	**3**
1923	131	98	27	3	3	0	0	0	0	0	0
1922	248	196	50	0	2	0	0	0	0	0	0
*1921	445	203	151	58	33						
*1920	1,007	382	254	351	20						
*1919	884	306	215	358	5						
*1918	1,049	366	388	290	5						

LABORATORY EXAMINATIONS.

YEAR.	TOTAL.	SYPHILIS.				GONORRHŒA.	
		Wassermann.		Spirochete.		Gonococcus.	
		Positive.	Negative.	Positive.	Negative.	Positive.	Negative.
1924	**733**	**79**	**256**	**0**	**2**	**70**	**326**
1923	194	52	117	2	2	8	13
1922	184	40	129	0	3	3	9
1921	280	63	178	2	3	20	14
1920	541	133	273	8	16	72	39
1919	311	77	200	0	4	30	0
1918	348	98	212	0	1	30	7

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* Until 1922, all V.D. cases were classified under either "Syphilis" or "Gonorrhœa."

BLIND PERSONS SERVICES.

A full account of the provision that is being made by the existing voluntary agencies for the welfare of blind persons in Aberdeen is given in the preceding Annual Report of the Medical Officer of Health.

In a recent decision relative to the responsibility of the Aberdeen Education Authority and the Town Council for the industrial training or technical education of a blind person aged 16 years, the Board of Health, after consultation with the Scottish Education Department, have decreed that the Education Authority may provide education and industrial training (including necessary maintenance) under Section 3 of the Education of Blind and Deaf-Mute Children (Scotland) Act, 1890, for the blind person between the age of 16 and 18 years at a school for the blind approved by the Scottish Education Department under that Section, *e.g.*, the Royal Blind School, West Craigmillar, Edinburgh. If, however, provision is not made under the 1890 Act, the alternative course is for the Education Authority to provide the technical education and the Town Council to provide the necessary maintenance under the Blind Persons Act, 1920.

In continuity of the policy of the Town Council, as outlined in the Minutes of Council of 7th April and 1st December, 1924, a Scheme for Promoting the Welfare of Blind Persons under Section 2 of the Blind Persons Act, 1920, was prepared on the instructions of the Public Health Committee, and as revised in the light of the above decision of the Board of Health was finally adopted by the Town Council in terms of the Council Minutes of 15th June, 1925. The Scheme is herewith submitted:—

CITY OF ABERDEEN.

BLIND PERSONS ACT, 1920.

Scheme for Promoting the Welfare of Blind Persons.

(As approved by the Scottish Board of Health—3rd July, 1925.)

MEMORANDUM.

In terms of the Council Minutes of 7th April, 1924, in regard to the Blind Persons Act, 1920, the Town Council received a report, dated 14th January, 1924, by the Medical Officer of Health on the present position of Aberdeen in relation to the requirements of the Blind Persons Act and relative circulars, and authorised it to be transmitted to the Scottish Board of Health. In the conclusion of the report, it was pointed out that in Aberdeen the voluntary system has for many years stood the test of the manifold requirements that the proper care of the blind demands—a condition of affairs that prevails in no other part of Scotland—and it was contended that the present voluntary system, adequately meeting the needs of blind persons in Aberdeen, should meantime be maintained. It was pointed out that, should the Council in any scheme bind themselves to make an annual contribution per capita or otherwise to either the Aberdeen Asylum for the Blind or the Aberdeen Town and County Association for Teaching the Blind at their Homes, it might possibly result in a diminution of the bequests, donations, and subscriptions which are at present fully meeting the requirements of Aberdeen and the North-Eastern Counties, and that a similar result might be experienced should the Council undertake to meet any deficit in the working of these two institutions. In terms of the above-mentioned Minutes, and having in view the circular, dated 22nd February, 1924, received from the Board of Health, withdrawing the restrictions of expenditure on grant-aided public health services, the Council resolved that, before proceeding further in the matter, the Medical Officer of Health should be instructed to report on all the special health services of the City, with respect to the urgency of their varying needs and the necessity for their development.

In terms of the Council Minutes of 1st December, 1924, the Council had before them the report, dated 6th October, 1924, by the Medical Officer of Health on the present requirements and future development of the municipal health services and the reciprocal relation of these health services with the Joint Hospitals Scheme, in which report it is pointed out that the total capital expenditure which will be involved in providing the necessary extension and development of the municipal health services is estimated at £227,000, and in which it is shown that increased provision for venereal diseases, tuberculosis, fevers, and maternity and child welfare are much more urgent requirements than is any additional provision for the welfare of blind persons.

Having these points in view, and having before them a letter from the Scottish Board of Health, dated 21st May, 1924, the Public Health Committee, at their meeting on 10th December, 1924, instructed the Medical Officer of Health to prepare a scheme for promoting the welfare of blind persons, under Section 2 of the Blind Persons Act, 1920. The Board's letter states *inter alia* that they are "satisfied that suitable provision under the existing powers is being made for the blind in Aberdeen, and that the Town Council are duly exercising their power to the extent required, having regard to the operations of the voluntary agencies in their area." The letter goes on to state that the suggested model scheme of the Board may be modified to meet the circumstances of the City, and it is suggested that the Council should incorporate within their scheme clauses dealing with (1) assistance to blind persons employed outside of institutions for the blind, and (2) maintenance of blind persons during their period of training.

In view of the adequacy of the voluntary provision and for the reasons stated, it has not been considered advisable to include in the Aberdeen scheme any financial commitment by the Town Council in connection with the Aberdeen Asylum for the Blind or the Aberdeen Town and County Association for Teaching the Blind at their Homes, other than what may appear to the Council to be necessary or expedient from time to time.

SCHEME.

1. The Town Council of Aberdeen will carry out the provisions of the Blind Persons Act, 1920, so far as incumbent on them, through the medium of existing approved voluntary agencies for the blind. For this purpose the Council will make such arrangements as appear to them from time to time to be necessary or expedient,

with the Aberdeen Asylum for the Blind and the Aberdeen Town and County Association for Teaching the Blind at their Homes.

2. For administrative purposes the Council will exercise the powers conferred on them by the Blind Persons Act, 1920, through their Public Health Committee, in terms of Section 2 (4) of the Act, and for this purpose the said Committee will have power to co-opt persons having special knowledge or interest in the blind, to a number not exceeding one-third of the whole Committee.

3. If there be any blind children below the age of five years living within the City of Aberdeen, whose natural guardians are incapable of properly undertaking their care, the Council will send such children to one of the existing residential schools, or to a nursery school, if and when such school is available, or place them under the care of suitable guardians. The Medical Officer of Health will be charged with the duty of seeing that blind children below the age of five years residing in the City of Aberdeen are properly cared for in their homes.

4. When blind persons within the City of Aberdeen have been trained and are capable of industrial employment in a workshop, the Council will, if and when it appears to them to be necessary or expedient, make arrangements for their employment in the workshops of the Aberdeen Asylum for the Blind.

This arrangement will not preclude the Council from sending blind persons for industrial employment to the workshops of other institutions should circumstances make it desirable.

Further, the Council will, if and when it appears to them to be necessary or expedient, contribute towards the cost of providing new or additional workshop accommodation by the Aberdeen Asylum for the Blind.

5. The Council will, if and when it appears to them to be necessary or expedient, contribute towards the provision and maintenance by the Aberdeen Asylum for the Blind of a hostel for blind workers.

6. The Council will, if and when it appears to them to be necessary or expedient, contribute towards the provision and maintenance of a residential home for any blind persons in the City of Aberdeen, who, from age or infirmity, are not capable of looking after their own needs, and cannot be properly cared for by relatives or friends.

7. The Council will, if and when it appears to them to be necessary or expedient, contribute towards the funds of the Aberdeen Asylum for the Blind and the Aberdeen Town and County Association for Teaching the Blind at their Homes.

In the event of the Council sending any blind person for industrial employment to any institution other than the Aberdeen Asylum for the Blind, or in the event of their sending any blind child below the age of five years for care to an institution, the Council will make payment to the institution in respect of such blind person or blind child, on a basis adjusted by the Council with the institution, with the approval of the Scottish Board of Health.

8. In the event of the Council undertaking at any time any of the main financial responsibilities set forth in Sections 4, 5, 6, and 7 of the scheme, the Council will make it a condition that they shall have representation on the managing committee

of the institution concerned, commensurate with the financial commitment involved. In this event also the Council will arrange that the accounts of the institution concerned shall be annually submitted to them, and all other reports the Council may require when called for, and that the institution concerned shall not extend in any way its operations involving expenditure in connection with any schemes for which the Council have undertaken liability, without the sanction of the Council.

9. The Council will co-operate closely with the Aberdeen Education Authority in all matters affecting the interests of the blind.

10. If any question, dispute, or difference shall arise in relation to any matter between the Council and any voluntary agency for the blind in regard to this scheme, the same shall be determined by the Scottish Board of Health, whose decision shall be final.

11. The Council will be prepared, if and when it appears to them to be necessary or expedient, and subject to the approval of the Scottish Board of Health, to make grants to any blind persons within the City of Aberdeen of such sums as may be necessary to start them in any business or employment so that they may be able in whole or in part to maintain themselves.

12. When any blind person over the age of eighteen years within the City of Aberdeen is undergoing a course of higher education with a view to a professional career, the Council will, if and when it appears to them to be necessary or expedient, and subject to the approval of the Scottish Board of Health, make provision in whole or in part for his or her maintenance during the period of such training.

13. When any blind person within the City of Aberdeen is undergoing a course of technical training under the Blind Persons Act, 1920, with a view to industrial employment, the Council will, if and when it appears to them to be necessary or expedient, make provision for his or her maintenance during the period of such training, except in those cases where the blind person is on the roll of poor at the commencement of training, and for this purpose will make such payment to the institution at which the person is receiving his or her technical training as the Council may adjust with the institution, with the approval of the Scottish Board of Health.

14. This scheme will come into operation on the 31st day of January, 1925, and it may, with the approval of the Scottish Board of Health, be modified or extended in such manner as the Council may from time to time decide.

J. Parlane Kinloch,
Medical Officer of Health.

Aberdeen, *19th January*, 1925.

During the year 1924, there were 4 persons who applied for and received from the Town Council assistance towards their maintenance during the period of technical training. At the end of December, 1924, 12 persons in all were receiving such assistance.

MATERNITY AND CHILD WELFARE SERVICES.

The admirable analysis of the Incidence and Causes of Infantile Mortality in Scotland as compared with England, contained in the Annual Report of the Scottish Board of Health for 1923, demonstrates the complexity of the problem which the varying infant mortality figures present.

It appears probable that a satisfactory explanation of the peculiarly high level of infant mortality in Aberdeen will have to await greatly increased knowledge of the etiology and pathology of the diseases of infants.

UNSATISFACTORY NATURE OF INFANT MORTALITY DATA.

The details of the mortality of children under 1 year of age in the various age-groups as contained in the Board of Health Report for 1922, and as now given in the Reports of the Registrar-General, permit of comparisons being made of different localities, but such comparisons are liable to be without value and sometimes grossly misleading on account of the nature of the data. It appears probable also that the position will be in no way different when the uniform and detailed returns which are now required by the Board of Health in relation to Maternity and Child Welfare Services have accumulated and are available for analysis, unless at the same time fresh light is thrown on the nature of the obscure biological phenomena of which the figures are an expression.

Environmental v. Physiological Influences.—The speculative nature of our present conceptions of the causes of infant mortality is apparent in the Board's Report. Thus, reference is made to the observations of the English Registrar-General on the effect of temperature on infant mortality, the cold winter quarter of the year yielding the highest mortality and the warm summer quarter the lowest without a single exception during the ten years 1911-1920. If environmental influences are the cause of the excessive deaths of infants in winter, modern knowledge would suggest that lack of fresh air and sunlight are responsible rather than the low temperature. Not only so, but, as the Report states, in cold countries like Norway and Sweden the infant mortality is low.

An equally good or equally bad biological explanation of the increased mortality in the winter quarter of the year can be suggested. Thus, it is well known that the varying periods of gestation among animals render it necessary that copulation shall take place at different periods of the year in order that the young may be born at the most favourable season in wild nature. In other words, the rut is adapted to the requirements of each species separately. Under domestication, however, these instincts fall into abeyance, and in the human species birth is largely independent of season. Why, when warmth, shelter, and food are available for the human young all the year round, should the temperature in the winter quarter of the year necessarily be the cause of increased infant mortality rather than a physiological reaction during uterine life to such an aberration from the more primitive fertilising rhythm? Is it not quite conceivable that the more recently acquired capacity of the human species to bear young without reference to season has not yet been fully stabilised, and that the instability is only later expressed by increased infant mortality in winter ?

In the present state of knowledge all such arguments are speculative from first to last.

Racial Influences.—In the absence of accurate information, also, racial characteristics cannot be ignored. It is conceivable that there is a greater tendency for pregnancy to reach full term in the population of Aberdeen who are largely the descendants of the broad-headed aristocrats of the Empire of the Brochs than in the more primitive races of the south. If this be so, then an unknown number of southern abortions would have to be added to the infant mortality figures of the south in order to make them comparable with the Aberdeen figures.

It is also conceivable that an increase of infant deaths from the so-called developmental diseases or from birth injuries may be the price that the Aberdonian has to pay for his broad-headed ancestry. In this connection, reference to Table XV. shows that after eliminating the excess of deaths due to whooping-cough and measles, the higher infant mortality of Aberdeen is wholly due to developmental diseases such as prematurity, malformations, atelectasis, and wasting and debility.

Racial differences as distinct from environmental differences are well known to exist in response to disease as, for example, in the different response of the people of Scotland as compared with the people of southern England to the toxin of diphtheria.

Disease Complexes.—The classical example of a disease with a seasonal incidence is summer diarrhœa, but this acute infectious disease entity suddenly disappeared from Britain in 1917, and the cause of that disappearance is entirely undetermined. The Board of Health's Report states that the prevention of deaths from diarrhœa is a matter of intelligent care, but this is true only of a comparatively small proportion of diarrhœal deaths. It was not increased care of infants that caused the infectious disease, summer diarrhœa, suddenly to disappear. Some other factor was at work.

The more that clinical experience is obtained, the more does it become obvious that the main mass of deaths at present certified as due to diarrhœa are deaths from a large variety of wasting diseases whose pathology is simply not known and in which a predominant terminal symptom is green stools and laxness of the bowels. With our present lack of knowledge medical practitioners cannot do other than certify such deaths as due to diarrhœa, although they are well aware that the diarrhœa is in no way specific. Clinical experience indicates that there is a very limited group of cases of diarrhœa directly due to alimentary disorder and consequent toxæmia, and these cases under appropriate treatment largely recover and return to normal. The much larger group of so-called diarrhœal cases show a wasting and debility which can best be described as being due to an inherently lower vitality, to a functioning of the body in which the metabolic processes are at a lower level than is normal. Such children under hygienic conditions can be saved from death—they recover to the extent that they can maintain an ordered existence at a lower level than the normal, as is evidenced by lower weight, lessened activity, and constant liability to metabolic disturbances; and whenever such children fail to secure ideal conditions for survival there ensues gross wasting, debility, gastro-intestinal symptoms (green stools and loose motions), toxæmia, tetany, and frequently death with or without convulsions. Clinical experience would indicate that these deaths are essentially due to developmental causes of which we as yet know very little. It is important to note, however, that the progeny of experimental animals which have been kept on an inadequate diet frequently show a somewhat similar clinical syndrome.

It may be that prematurity itself, which is the chief cause of Aberdeen's excessive infant mortality, is largely dependent on the defective nutrition of the mother, but there is no evidence that the mothers of Glasgow are better nourished than the mothers of Aberdeen. On the contrary, there is evidence in the opposite direction (*e.g.* the incidence of rickets in Glasgow as compared with Aberdeen).

There is evidence that the respiratory death-rate may be diminished by open air conditions. To that extent, deaths from measles and whooping-cough may be diminished, but it is doubtful if the diminution will have an obvious effect on the statistical form of these diseases until such time as a specific prophylaxis is available for each of them.

Future Prospect.—Such random considerations briefly indicate the complexity of the problem which infant mortality presents. No matter what group of infant deaths is examined, the causes of the deaths are found to be exceedingly varied and complex, and not infrequently the essential nature of the diseases that result in these deaths is quite obscure. There is, however, every hope for the future.

The study of the expectant mother in the light of the newer knowledge of nutrition is full of promise. The increasing knowledge of the beneficent action of fresh air and sunlight can be made available for mothers and children. Indeed, the response that is already being made to instruction at the Child Welfare Centres is bound to have far-reaching effects. Already children are being provided with a future prospect that was largely denied to their parents. The routine exercise in the open air and sunlight, the more ordered life, the regulation of all the functions of the body, the more adequate diet, more hygienic clothing, greater cleanliness, and the improving environment—all these will breed a healthier and more handsome race.

The time is probably not distant when the subject of early rickets, as he later becomes instructed as to his deformity, will naturally exhibit resentment towards those who failed to secure for him in early life the advantages which the municipal health services would seek to impose.

INFANTILE MORTALITY.

During the year 1924, there were 421 deaths among children under one year of age, as compared with an average of 474 during the 1919-1923 quinquennium. The infant-mortality rate, expressed as deaths per 1,000 births,

TABLE XV.—DEATH RATES OF CHILDREN UNDER ONE YEAR.

Six Principal Towns in Scotland.

Average 1919-1923.

	East Coast Towns.			West Coast Towns.		
	Edinburgh.	Dundee.	Aberdeen.	Glasgow.	Paisley.	Greenock.
Number of Births (corrected for transfers), . . .	8,847	4,278	4,047	28,635	2,164	2,375
Number of Deaths of Children under 1 year, All Causes	835	496	474	3,069	200	248
Mortality per 1,000 Births:—						
Prematurity, Malformation, Atelectasis, and other Diseases of Early Infancy	28	29	32	25	27	24
Wasting and Debility, .	11	21	24	15	13	22
Convulsions, . . .	4	3	6	4	4	4
Digestive Diseases, . .	8	14	10	13	10	11
Pneumonia and Bronchitis,	21	26	23	25	21	21
Measles, Whooping Cough, Diphtheria, and Scarlet Fever,	8	7·5	8	11	9	8
Tuberculosis, . . .	3	2	2	2	1	3
Syphilis, ...	2	3	3	1	1	2
Suffocation, . . .	1	2·5	1	1	1	0
Other causes, . . .	8	8	8	10	5	9
Mortality per 1,000 Births, . . All Causes	94	116	117	107	92	104

was 122 during 1924, as against an average of 117 during the 1919-1923 quinquennium. The increase in the infant-mortality rate from 104 in 1923 to 122 in 1924 was due to the prevalence of whooping-cough and measles in 1924. Thus, in 1924, whooping-cough caused 27 deaths in infants, as compared with 3 deaths in 1923; measles caused 22 deaths in 1924, as compared with 12 deaths in 1923; and bronchitis and pneumonia were responsible for 77 deaths of infants in 1924, as compared with 66 deaths in the preceding year. It is a common experience to find that deaths of infants registered as due to diseases of the respiratory system are markedly increased during the epidemic prevalence of whooping-cough and measles. But even if the excess of deaths due to measles and whooping-cough and the complications associated with them are deducted, the infant-mortality rate for Aberdeen nevertheless remains abnormally high. Thus, as shown in Table XV., the infant-mortality rate in Aberdeen compares unfavourably with the infant-mortality rates in the industrial towns of the west, such as Greenock, Paisley, and Glasgow, although the environmental conditions are known to be of an inferior order in these western towns; but the table makes it clear that after fluctuations due to deaths from whooping-cough and measles have been eliminated, the higher infant mortality in Aberdeen is wholly due to such developmental diseases as prematurity, malformations, atelectasis, and wasting and debility.

The two chief causes of mortality among infants in 1924, as appearing in Table XVI., were prematurity and respiratory diseases, each being responsible for 77 deaths. About three-fourths of the deaths from prematurity took place within the first week of birth. In the 1919-1923 quinqucnnium there was an average of 102 deaths from prematurity, and 93 deaths from respiratory diseases.

The third chief cause of death was atrophy, debility and marasmus, with 68 deaths, more than half of these occurring during the first three months of life. There was an average of 100 deaths from these diseases during the preceding five years.

Convulsions come next among the causes of death, with 29 deaths, as compared with an average of 21 for the preceding five years.

Diseases of the digestive system, including diarrhœa, come next, with 28 deaths, as against an average of 42 for the 1919-1923 quinquennium.

Next among the causes of death are the specific infectious diseases, of which whooping-cough, measles, tuberculosis and syphilis are the chief.

Table XVII. shows the death-rates among children under one year of age, in terms of (*a*) legitimate deaths per 1,000 legitimate births, (*b*) illegitimate deaths per 1,000 illegitimate births, and (*c*) total deaths per 1,000 births.

In Tablc XVIII. the causes of death are somewhat differently grouped from those in Table XVI., and death-rates are substituted for numbers of deaths. Causes such as prematurity, congenital defects, and diseases of early infancy, which are probably to be associated wholly with pre-natal or parturient conditions, are brought together into one group; while another group is constituted by diseases of the digestive system, wasting and debility, and convulsions—causes which may be aggravated by lack of care of the infant after birth. The table allows of a ready comparison being made between 1924 and the preceding ten years, in respect not only of the two groups referred to but also in regard to certain other important causes of death, including each of the principal zymotics. It will be seen that in 1924 the death-rates from measles and whooping-cough were above the average.

In this table also the infants have been divided, in respect of age, into three specially arranged groups, namely, one of under two weeks old, representing the period most reflecting the effect of ante-natal conditions; another of between two weeks and under six months, covering the period before the commencement of teething and increased pancreatic activity, during which, in ordinary circumstances, the infant should continue to be wholly dependent for its food on the mother's milk; and third, the remaining six months of the first year of life, during which, as a rule,

Table XVI.—Aberdeen.—Causes of Death among Children under Five Years of Age.—*Year* 1924.

CAUSES OF DEATH.	AGE.																	Average for Preceding 5 Years. (1919-23.)	
	First Year.												Second to Fifth Years.				Total		
	First Four Weeks.				First Three Months.			The Four Quarters.				Total							
	0–1	–2	–3	–4	0–1	–2	–3	0–3	–6	–9	–12	0–1	–2	–3	–4	–5	1–5	0–1	1–5
Chicken Pox	...	.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	0·4
Measles	...	...	...	...	...	...	1	1	4	8	9	22	19	7	3	5	34	14	29
Scarlet Fever	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	0·2	3
Whooping Cough	...	.	...	1	1	1	...	2	11	7	7	27	24	9	3	8	44	17	16
Diphtheria	...	...	1	...	1	1	...	2	...	1	...	3	4	...	1	...	5	2	10
Erysipelas	...	...	...	...	...	...	...	...	...	1	...	1	...	...	...	...	..	1	0·2
Epidemic Cerebro-Spinal Meningitis	...	...	...	...	...	...	...	...	1	...	...	1	...	1	...	...	1	1	1
Tuberculosis of (*a*) Brain	...	...	...	...	...	...	...	...	1	1	1	3	11	9	4	...	24	3	10
Tuberculosis of (*b*) Abdomen	...	...	...	...	...	...	...	...	...	2	1	3	3	...	2	2	7	1	5
Tuberculosis of (*c*) Lungs	...	...	...	...	...	..	...	...	2	1	1	4	1	...	...	...	1	2	3
Tuberculosis of (*d*) Other forms	...	...	...	...	...	...	...	...	...	1	...	1	3	...	...	1	4	1	4
Meningitis	...	...	...	...	...	...	...	...	1	3	1	5	2	2	...	...	4	4	3
Hydrocephalus	1	1	...	...	2	...	...	2	1	...	.	3	1	...	...	...	1	1	1
Convulsions	5	4	1	...	11	2	3	16	9	2	2	29	5	1	...	...	6	21	6
Pneumonia	...	...	2	1	3	2	7	12	8	16	9	45	19	4	3	...	26	57	30
Bronchitis	...	...	1	...	2	2	5	9	9	10	4	32	6	...	...	...	6	36	5
Diarrhoea and Enteritis	...	1	...	...	1	5	2	8	7	2	3	20	...	1	...	...	1	25	3
Other Digestive Diseases	...	...	...	...	...	...	1	1	2	4	1	8	...	1	3	2	6	17	4
Congenital Malformations	...	1	...	1	2	3	1	6	...	...	...	6	1	...	...	...	1	5	0·4
Congenital Heart	3	1	...	...	4	...	...	4	...	2	..	6	...	...	...	...	...	4	0·4
Prematurity	57	6	6	3	72	3	2	77	...	...	...	77	..	...	...	...	...	102	
Atrophy, Debility, and Marasmus	5	1	1	...	7	15	14	36	29	3	...	68	3	...	...	...	3	100	2
Atelectasis	13	2	...	...	15	...	...	15	...	...	...	15	...	...	...	...	...	14	...
Injury at Birth	6	1	...	...	7	...	...	7	...	...	...	7	...	...	...	...	...	3	...
Syphilis	1	...	...	3	4	..	1	5	2	...	...	7	...	...	...	...	...	14	1
Burns and Scalds	...	...	...	..	...	...	...	...	...	...	1	1	5	4	3	1	13	1	10
Suffocation	3	...	...	1	4	1	1	6	...	...	...	6	...	...	...	...	...	3	0·2
Other Accidents	..	...	...	...	...	...	...	...	...	...	...	...	3	...	3	1	7	0·2	3
Other Causes	2	1	...	2	5	2	1	8	7	1	5	21	3	5	...	4	12	24	14
All Causes	96	19	12	12	141	37	39	217	94	65	45	421	113	44	26	24	207	474	165
Average for preceding 5 years	106	27	22	20	180	51	38	269	108	51	46	474	92	38	19	16	165		

TABLE XVII.—ABERDEEN.—DEATH RATES AMONG CHILDREN UNDER ONE YEAR OF AGE.

(a) Legitimate Deaths per 1,000 Legitimate Births; (b) Illegitimate Deaths per 1,000 Illegitimate Births; (c) Total Deaths per 1,000 Births.

Causes of Death.	First Four Weeks.												First Three Months.									The Four Quarters.														
	0–1			–2			–3			–4			*0–1			–2			–3			*I.			II.			III.			IV.			Total		
	Legit.	Illegit.	Both.	Legit.	Illegit.	Both.	Legit.	Illegit.	Both.	Legit.	Illegit.	Both.	Legit.	Illegit.	Both.	Legit.	Illegit.	Both.	Legit.	Illegit.	Both.	Legit.	Illegit.	Both.	Legit.	Illegit.	Both.	Legit.	Illegit.	Both.	Legit	Illegit.	Both.	Legit.	Illegit.	Both.
Chicken Pox,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Measles,	..		..	..	..		..	..	..	..	..	..	..	..	..	..	..	..	0·3	..	0·3	0·3	..	0·3	1·2	..	1·2	2·5	..	2·3	2·8	..	2·6	6.8	..	6·4
Scarlet Fever,		..	..	..	..		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Whooping Cough,	..	..	..		..	..	..	..	..	0·3	..	0·3	0·3	..	0·3	0·3	..	0·3	..	..	..	0·6	..	0·6	3·4	..	3·2	2·2	..	2·0	2·0	4·0	2·0	8·2	4·0	7·8
Diphtheria,	..	..	..	..	..	..	0·3	..	0·3	..	..	..	0·3	..	0·3	0·3	..	0·3	..	..	..	0·6	..	0·6	..	..	..	0·3	..	0·3	..	..	..	0·9	..	0·9
Erysipelas,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0·3	..	0·3	..	..	..	0·3	..	0·3
Ep. Cerebro-Sp. Meningitis,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0·3	..	0·3	..	..	..	..	..	..	0·3	..	0·3
Tuberculosis (a) Brain,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0·3	..	0·3	0·3	..	0·3	0·3	..	0·3	0·9	..	0·9
(b) Abdomen,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0·3	4·0	0·6	0·3	..	0·3	0·6	4·0	0·9
(c) Lungs,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0·7	..	0·6	0·3	..	0·3	0·3	..	0·3	1·3	..	1·2
(d) Other Forms	..	..		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0·3	..	0.3	..	..		0·3	..	0·3
Meningitis,	..		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0·3	..	0·3	0·7	4·0	0·9	0·3	..	0·3	1·3	4·0	1·5
Hydrocephalus,	0·3		0·3	0·3	..	0·3	..	..	..	..	..	..	0.6	..	0·6	..	..	..	..	..	..	0·6	..	0·6	0·3	..	0·3	..	..	..	..	..	..	0·9	..	0·9
Convulsions,	1·3	4·0	1·5	1·3	..	1·2	0·3	..	0·3	..	..	..	3·3	4·0	3·2	0·6	..	0·6	0·3	8·1	0·9	4·2	12.1	4·7	2·9	..	2·5	0·6	..	0 6	0·6	..	0·6	8·3	12·1	8·4
Pneumonia.	..	..	..	..	..	..	0·6	..	0·6	0·3	..	0·3	0·9	..	0·9	0·6	..	0·6	1·3	12·1	2·0	2·8	12·1	3·5	2·0	8·1	2·3	5·0	..	4·7	2·8	..	2·6	12·6	20·2	13·1
Bronchitis,	..	..	..	..	..	..	0·3	..	0·3	..	..	..	0·6	..	0·6	0·6	..	0·6	1·6	..	1·5	2·8	..	2·6	2·8	..	2·6	3·1	..	2·9	1·3	..	1·2	10·0	..	9·3
Diarrhoea and Enteritis.	..	..	..	0·3	..	0·3	..	..	..	..	..	..	0·3	..	0·3	0·9	8·1	1·4	0·3	4·0	0·6	1·5	12·1	2·3	2·2	..	2·0	0·3	4·0	0·6	0·9	..	0·9	4·9	16·1	5·8
Other Digestive Diseases,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0·3	..	0·3	0·3	..	0·3	0·6	..	0 6	1·3	..	1·1	0·3	..	0·3	2·5	..	2·3
Congenital Malformations,		..		0·3	..	0·3	..	..	..	0·3	..	0·3	0·6	..	0·6	0·7	4·0	0·9	0·3	..	0·3	1·6	4·0	1·7	..	..	..	..	..	..	..	.	..	1·6	4·0	1·7
Congenital Heart,	0·9	..	0·9	0·3	..	0·3	..	..	..	..	..	..	1·2	..	1·1	..	..	..	..	..	..	1·2	..	1·1	..	..	..	0·7	..	0·6	..	..	..	1·9	..	1·7
Prematurity,	16·3	20·2	16·6	0·9	12·1	1·8	1·6	4·0	1·7	0 9	..	0·9	19·8	36 3	20·9	0·6	4·0	0·9	0·6	..	0·6	21·0	40·3	22·4	..	..	..	..	..	..	..	..	..	21·0	40·3	22·4
Atrophy, Marasmus, & Debility	1·3	4·0	1·5	0·3	..	0·3	0·3	..	0·3	..	..	..	1·9	4·0	2·0	3·2	20·2	4·4	3·1	16·1	4·1	8·1	40·3	10·5	5·3	48·4	8·4	1·0		0·9	..	..	..	14·4	88·7	19·8
Atelectasis,	3·8	4·0	3·8	0·3	4·0	0·6	..	..	..	..	..	..	4·1	8·1	4·4	..	..	..	..	..	..	4·1	8·1	4·4	..	..	..	..	..	..	..	..	..	4·1	8·1	4·4
Injury at Birth,	1·6	4·0	1·8	0·3	..	0·3	..	..	..	..	..	..	1·9	4·0	2·0	..	..	..	..	..	..	1·9	4·0	2·0	..	..	..	..	..	..	..	..	..	1·9	4·0	2·0
Syphilis,	0·3		0·3	..	..	..	..	..	..	0·3	8·1	0·9	0·6	8·1	1·1	..	..	..	..	4·0	0·3	0·6	12·1	1·4	0·3	4·0	0·6	..	..	..	..	..	..	0·9	16·1	2·0
Burns and Scalds,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0·3	..	0·3	0·3	..	0.3
Suffocation,	0·3	8·1	0·9	..	..	..	..	..	..	0·3	..	0·3	0·6	8·1	1·1	0·3	..	0·3	0·3	..	0·3	1·2	8·1	1·7	..	..	..	..	..	..		..	..	1·3	8·1	1·7
Other Accidents,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Other Causes,	..	8·1	0·6	0·3	..	0·3	..	..	..	0·6	..	0·6	0·9	8·1	1·5	0·3	4·0	0·6	0·3	..	0·3	1·5	12·1	2·4	2·3	..	2·0	0·3	..	0·3	1·6	..	1·4	5·8	12·1	6·1
All Causes,	26·1	52 4	28·2	4·6	16 ·1	5·7	3·4	4·0	3·5	3·0	8·1	3·6	37·9	80·7	41·0	8·3	40·3	11·0	8·7	44·3	11·5	54·	165·3	63·2	24·9	60·5	27·8	19·6	12·0	19·1	13·8	4·0	13 4	113·2	241·8	122·4

* This column includes all Death-rates in preceding columns.

Table XVIII.—Aberdeen.—Infant Mortality.—*Years* 1914-1924.

(*Corrected for transferred deaths.*)

YEAR.	No. of Births.	Births per 1,000 of Population.	Deaths of Infants under 1 year.	Deaths of Infants under 1 year per 1,000 Births.	No. of Survivors.	Survivors per 1,000 of Population.	Death-Rates among Children under 1 Year of Age from Chief Causes per 1,000 Births.										Death-Rates from All Causes at Ages per 1,000 Births.		
							Prematurity, Congenital Defects, and Dis of Early Infancy.	Dis. of Digest. System, Wasting and Debility, Convulsions.	Bronchitis and Pneumonia.	Common Zymotic Diseases.				Tuberculosis.	Syphilis.	Suffocation.	Under 2 Weeks.	Above 2 Weeks and under 6 Months	Above 6 Months and under 1 Year.
										Measles.	Whooping Cough.	Diphtheria.	Scarlet Fever.						
1924 . .	3437	21·4	421	122	3016	18·8	33	36	22	6	8	1	0	3	2	2	33	57	32
1923 . .	3766	23·4	391	104	3375	21·0	30	42	18	3	1	0	0	3	3	1	33	51	20
1922 . .	3969	24·7	527	133	3442	21·4	31	37	28	10	12	0·3	0	2	4	1	32	63	38
1921 . .	4254	26·6	460	108	3794	23·7	30	42	22	1	1	1	0	1	2	1	31	60	18
1920 . .	4868	30·3	591	121	4277	26·7	33	42	25	3	4	0·2	0·2	2	4	1	31	69	21
1919 . .	3379	21·0	399	118	2980	18·5	40	37	21	0·3	4	1	0	2	4	2	39	54	25
Average 1919-1923	4047	25·2	474	117	3573	22·3	32	40	23	3	4	0·5	0·1	2	3	1	33	60	24
1918 . .	2721	16·8	390	143	2331	14·4	33	54	26	4	7	1	0	3	3	1	29	78	36
1917 . .	2880	17·8	399	139	2481	15·3	26	49	28	7	6	1	0	5	5	2	27	73	39
1916 . .	3546	21·8	398	112	3150	19·4	34	35	17	1	4	1	0·3	2	5	3	33	56	23
1915 . .	3784	23·2	654	173	3130	19·2	33	57	35	12	11	2	2	6	2	3	34	81	58
1914 . .	4006	24·5	487	121	3519	21·5	34	46	19	1	2	1	1	3	3	2	33	59	29
Average 1914-1918	3387	20·8	466	137	2921	18·0	32	48	25	5	6	1	1	4	4	2	31	69	37
Average 1914-1923 ten years)	3717	23·0	470	126	3247	20·1	32	44	24	4	5	1	0·3	3	4	1	32	64	30

the use of other kinds of food, supplementary or substitutionary, begins. It will be seen that at the earliest period there was in 1924, as compared with the average for the preceding ten years, practically no difference in the death-rates. During the second period, the death-rates were diminished; and during the third period there was a slight increase.

In Table XVIII., also, two interesting columns show the number of infants surviving at the end of one year from birth, and the proportion which the survivors bear to the population. This rate, which represents the net gain to the population after the perils peculiar to the first year of life have been passed, was, in 1924, 18·8 per 1,000 of population, as compared with an average of 20·1 for the ten years 1914-1923. This rate is a more exact indication than the birth-rate of the real internal addition to the population.

BIRTHS.

The figures of the births registered in Aberdeen during 1924 are analysed in detail in Chapter VII. of this Report.

The number of births registered in Aberdeen during the year was 3,527 (3,239 legitimate and 288 illegitimate).

The particulars regarding the live births and still-births notified during the year to the Health Department are as follows:—

Attended by	No. of Live Births.	No. of Still Births.	No. of Still Births per 1,000 Live Births.
Midwives,	739	23	31
Maternity Hospital—			
(*a*) In Wards,	371	42	113
(*b*) At Home,	113	4	35
Medical Practitioners,	2,275	75	33
Not attended,	7	...	...
Total,	3,505	144	41

The bodies of 65 still-born children or children who had died soon after birth, were examined for spirochetes, which were found in 3 cases, giving a percentage of 4·6. Arrangements were made to have the mothers of these children in which spirochetes were found treated at the Venereal Centres.

MATERNAL MORTALITY.

There were 19 deaths or women from causes associated with pregnancy or childbirth, including all deaths whatever the precise cause within four weeks after childbirth (or later if illness originated in the puerperium). All these deaths were inquired into by the Health Visitors, or information regarding them was obtained from the attending Medical Practitioners, who co-operate in giving the desired information.

Year.	Number of Births (Corrected for Transfers).	Maternal Deaths.		Puerperal Sepsis.	
		Number of Deaths.	Rate per 1,000 Births.	Number of Deaths.	Rate per 1,000 Births.
1924	3,437	19	5·5	6	1·7
1923	3,766	24	6·4	8	2·1
1922	3,969	30	7·6	12	3·0
1921	4,254	27	6·3	6	1·4
1920	4,868	38	7·8	5	1·0
1919	3,379	27	8·0	1	0·3
Aver. 1919 23	4,047	29	7·2	5	1·6

It will be seen from the table that during 1924 there were 5·5 maternal deaths per 1,000 births, and of these the deaths from sepsis were 1·7 per 1,000 births.

REPORT UNDER MIDWIVES (SCOTLAND) ACT, 1915.

The report for the year 1924 under the Midwives (Scotland) Act, 1915, which has already been transmitted to the Central Midwives Board, is herewith submitted:—

The number of midwives who intimated to the Local Authority their intention to practise in the district was 29.

Births in Area or District.

Total Number of Births during 1924.	Total Number of Deaths of New-born Children (within ten days) during 1924.	Actual Number of Births attended by Midwives during 1924.	Actual Number of Deaths of New-born Children (within ten days) occurring in the practice of Midwives during 1924.	Actual Number of Cases not attended by a Doctor or Midwife during 1924.	
				Births.	Deaths.
Live—3,505 Still— 144	108	Live—739 Still— 23	19	7	3

Cases of Ophthalmia Neonatorum.

Total Number of Cases during 1924.	Actual Number of Cases occurring in the practice of Midwives during 1924.	Actual Number of Cases occurring where confinement not attended by a Doctor or Midwife during 1924.
69	28	Nil

Cases of Puerperal Sepsis.

Total Number of Cases during 1924.	Total Number of Deaths during 1924. (Uncorrected for Transfers.)	Actual Number of Cases occurring in the practice of Midwives during 1924.	Actual Number of Deaths occurring in the practice of Midwives during 1924.	Actual Number of cases occurring where confinement not attended by a Doctor or Midwife during 1924.	
				Cases.	Deaths.
15	8	2	Nil	Nil	Nil

Cases of Still-birth (Dead Born).

Total Number of Cases during 1924.	Actual Number of Cases occurring in the practice of Midwives during 1924.
144	23

Cases of Emergency.

Notifications were received from midwives of having in 181 cases sent for medical assistance. In all cases medical assistance was obtained, and in one case it was found necessary to send for a second doctor. In 120 cases the assistance was required for the mother and in 61 cases for the child.

Summary of Cases.

1. During pregnancy,	10
2. During parturition,	93
3. After parturition,	17
4. For infant,	61
Total,	181

£174 was paid to doctors for the above services.

General Report on the Working of the Act.

During the year the Act worked smoothly in Aberdeen. It was not found necessary to suspend any midwife from practice. Increasing use was made of the arrangements at the Child Welfare Centres for the examination of urine of patients sent by midwives. The midwives attended 21 per cent. of the confinements in this area.

HOME VISITATION.

A record of the number of first visits and re-visits to infants under 1 year of age, to children in the 1-5 year period, and to expectant mothers, together with a measure of prematurity, of the nature of infant feeding, and of attendances at the ante-natal clinic is here submitted :—

(1) Infants—(*a*) Number of first visits, 3,437 (legitimate, 3,224; illegitimate, 213).
  (*b*) Number of re-visits, 39,472 (legitimate, 36,519; illegitimate, 2,953).
   Visits by Voluntary Workers, 139.
  (*c*) Number of Infants at age of six months—
   (i.) Breast fed, 1,029—50·9 per cent.
   (ii.) Partially breast fed, 186—9·2 per cent.
   (iii.) Artificially fed, 807—39·9 per cent.
  (*d*) Number of infants born—
   (i.) Prematurely, 258—7·4 per cent.
   (ii.) At full term, 3,247—92·6 per cent.

(2) Children (1-5 years)—(*a*) Number of first visits, 733.
  (*b*) Number of re-visits, 1,935.

(3) Expectant Mothers—(*a*) Number of first visits (not visited, patients come to clinics).
  (*b*) Number of re-visits (not visited, patients come to clinics).
  (*c*) Number who consulted Ante-Natal Clinic, 637.

VOLUNTARY HEALTH VISITORS' REPORT.

The Voluntary Health Visitors' Report, which is separately submitted, indicates the valuable contribution that is made to the work of Maternity and Child Welfare by the voluntary workers.

ANTE-NATAL CONSULTATIONS.

The extent and nature of the ante-natal work undertaken during the year at the Maternity Hospital Ante-Natal Annexe (consultations twice weekly, of about 2 hours' duration) and at the Child Welfare Clinics (daily consultations) is summarised as follows:—

	Maternity Hospital Ante-Natal Annexe.	Child Welfare Clinics.
Total Number of Attendances,	1,108	329
Total First Attendances,	388	249
Conditions found—		
Normal,	215	129
Albuminuria and toxæmia,	24	66
Malpresentations,	108	—
Contracted pelvis,	32	—
Constipation,	—	16
Hæmorrhage,	8	—
Sickness,	—	8
Malnutrition,	—	6
Venereal disease	—	2
Dental caries,	—	5
Heart, lungs, &c.	12	10
Other complications,	21	7
Not pregnant,	8	—
Number of Cases—		
(1) Referred to Ante-Natal Ward,	116	—
(2) Referred to family doctor or otherwise,	43	35
(3) Treated at Clinic,	229	135
(4) Referred to Maternity Hospital Ante-Natal Clinic,	—	79

POST-NATAL AND OTHER CONSULTATIONS.

There were 223 first attendances and 602 re-attendances at post-natal and other consultations during the year.

CHILD WELFARE CONSULTATIONS.

The extent and nature of the work done at the Child Welfare Consultations can be summarised as follows:—

Name of Centre.	Number of Weekly Sessions.	Duration (hrs.).
Woodside,	1	1
Charlotte Street,	2	2 to 2½
Torry,	1	1
Old Aberdeen,	1	1
Holburn (Voluntary),	1	1
Castlegate,	3	1½ to 2½

(*a*) Total Number of Attendances—(1) Under 1 year of age, 3,513.
(2) Over 1 year of age, 1,587.
(*b*) Number of First Attendances—(1) Under 1 year of age, 791.
(2) Over 1 year of age, *347.

* This number is largely understated as many children who were registered previously as being under 1 year have not been re-registered when they became over 1 year.

(*c*) *Illnesses*—	Children under 1 year.	Children over 1 year.
Digestive System—Vomiting,	69	11
Enteritis,	107	32
Constipation,	80	6
Malnutrition,	137	40
Thrush,	20	3
Parasitic worms,	—	11
Respiratory System—Bronchitis,	38	20
Pneumonia,	1	3
Nasal catarrh,	72	5
Circulatory System,	2	—
Nervous System,	5	3
Skin—Infective conditions,	28	25
Other,	49	16
Venereal Diseases—Syphilis,	8	—
Dental caries,	—	44
Genito-Urinary System,	1	8
Eyes—Acute infections,	15	5
Refraction errors,	3	3
Ears,	25	5
Nose and Throat—Tonsils and adenoids,	—	12
Other,	1	—
Infectious diseases,	8	16
Tuberculosis,	—	1
Enlarged glands,	6	18
Congenital malformations,	52	10
Hernia,	27	7
Rickets,	—	32
Accidents,	11	3
Miscellaneous,	26	8
Totals,	791	347

Rickets.—Modern views concerning the etiology and treatment of rickets are fully discussed in the section of this Report dealing with Metabolism and Disease. It would appear that if the diet is adequate, rickets will not develop.

In the above table it is shown that in 32 cases, or 9 per cent. of the children of 1-5 years examined, rickets was stated to be the chief condition for which the child was brought to the Clinic. All of these were of the well-marked type (with enlargement of the ends of the long bones or deformity of the bones), and were treated at the Sick Children's Hospital or in the Marasmus Ward at the City Hospital. Other cases of a less severe type of rickets, but suffering from some other condition which appeared at the time of examination to be of more importance, have not been recorded in the table.

As bearing on this subject, it is interesting to refer to the incidence of rickets in older children as discovered by Dr. Rose, the School Medical Officer. In his Annual Report for 1914 Dr. Rose reported on a special investigation which he had made into the incidence and consequences of rickets in five-year-old children in 1911-12. Of 3,742 children examined, 1,914 were boys and 1,828 girls. Of the boys, 39·9 per cent. showed traces of rickets, and of the girls 32·7 per cent.—or a total of 37·4 per cent. With regard to the height and weight of these rickety children, the rickety boys were 1·6 inches shorter and 4·2 lbs. lighter than non-rickety boys of the same age; while the rickety girls were 1·3 inches shorter and 4·7 lbs. lighter than non-rickety girls of the same age. Dr. Rose re-examined those children at the age of 13 years, and gives the results in his Annual Report for 1924. He found the condition of the children with regard to rickets almost the same as at the earlier examination, 37 per cent. being rickety and with a proportionate deficiency in height and weight. The rickety boys were 2·1 inches shorter and 9·1 lbs. lighter than non-rickety boys of the same age, and the rickety girls were 2·6 inches shorter and 10·6 lbs. lighter than non-rickety girls of the same age.

SPECIAL TREATMENT CENTRES.

The *Dental Clinic*, which functions under the joint arrangement with the Education Authority and the Town Council, provided the following services:—

Number of Attendances—(1) Mothers, 93 (48 cases).
(2) Children, 105 (88 cases).
Classified Summary of Conditions Remedied—
(1) Mothers—Fillings, 3; extractions, 273.
(2) Children—Fillings, 5; extractions, 359.
Number of dentures supplied—*Nil.*

The *Ophthalmic Clinic*, which functions under the joint arrangement with the Education Authority and the Town Council, and is confined to the treatment of cases suffering from refractive defects, &c., was utilised only to the extent of providing treatment for 4 cases of strabismus. It is obvious that remedial eye work must be developed.

Other Ailments.—No records available.

Provision of Insulin.—No cases requiring insulin were brought to the attention of the Health Department.

DAY NURSERIES, KINDERGARTENS, AND PLAY CENTRES.

The Day Nursery at Charlotte Street undertakes the main work under this heading, and there is in addition a play-centre at the Castlegate Child Welfare Centre which is open daily from 2 to 5 p.m. The attendances and charges at Charlotte Street Day Nursery are as follows:—

Number of Attendances—Under 1 year of age, 3,761.
Over 1 year of age, 4,092.
Charges—5d. per day for 1 child; 9d. per day for 2 children.
Receipts, £158 3s. 1d.

FOOD AND MILK.

During the year, food and milk was supplied to the following extent:—

(*a*) Number of applications for food and milk—Mothers, 315; children, 310.

(*b*) Number of cases certified on medical grounds as requiring food or milk—Mothers, 285; children, 285. (All these were cases certified as necessitous.)

Gross cost, £837 8s. 8½d. Sums recovered, £311 18s. 0d. Nett cost, £525 10s. 8½d.

Milk substitute in the form of Glaxo was supplied to 75 recipients (not included in (*b*)) at cost price on necessitous grounds. Cod liver oil emulsion, Robolcine and Virol were supplied at cost price or free at the discretion of the Medical Officer, where considered necessary.

MEASLES AND WHOOPING-COUGH.

A detailed statement of the position in Aberdeen as regards measles and whooping-cough is contained in the section of the Report dealing with infectious diseases. As regards children under 5 years of age suffering from measles and whooping-cough, the following information is submitted:—

	Measles.	Whooping-cough.
Number of cases notified (partial notification),	823	1,092
Total number of deaths,	56	71
(*a*) From measles,	18	24
(*b*) From sequelæ,	38	47
Number of cases removed to hospital,	74	82
Number of special domiciliary visits—		
(*a*) First visits,	541	348
(*b*) Total visits,	2,627	1,014

Details of special staff engaged for epidemics—One senior nurse from the City Hospital was engaged practically full-time in visiting cases of measles and whooping-cough in their homes, and these visits were confined to children under 5 years of age.

OPHTHALMIA NEONATORUM.

Ophthalmia neonatorum is referred to in the sections of this Report dealing with infectious diseases and venereal diseases. The following additional information is submitted:—

Year.	Number of Registered Births.	Number of Notified Cases of Ophthalmia Neonatorum.	Rate per 1,000 Registered Births.
1924,	3,527	69	19·6
1923,	3,847	63	16·3
1922,	4,038	47	11·6
1921,	4,336	100	23·1
1920,	5,010	112	22·4
1919,	3,458	99	28·6
1918,	2,794	39	13·9
1917,	2,946	42	14·3
1916,	3,596	40	11·1
1915,	3,835	40	10·4

Cases notified during 1924—	By Doctor,	29
	By Midwife,	21
	By Maternity Hospital,	4
	By Health Visitors,	15

Number of cases in which infection was gonococcal, 10, or 14·5 per cent. of cases.

Six cases were treated in residential institutions.

A complete cure was obtained in all cases except one, in which there remained a corneal opacity in the right eye causing partial impairment of vision.

EPIDEMIC DIARRHŒA.

As has already been pointed out, this disease disappeared from Scotland in 1917. Should the disease recur, arrangements are in force by which cases will be largely removed to hospital with a view to having the disease fully investigated from the bacteriological standpoint.

ABERDEEN MATERNITY HOSPITAL AND ANTE-NATAL ANNEXE.

The Maternity Hospital is a voluntary institution; and the Ante-Natal Annexe, providing an out-patient department and 8 beds, was presented by the Town Council to the Directors of the Maternity Hospital, the Town Council undertaking responsibility for its maintenance. A statement of the in-patient work of the Hospital and Annexe, and of the work done from the Hospital in the homes of patients, is recorded as follows:—

Indoor City Cases.

1. *Ante-Natal Cases*—

(*a*) Number of cases treated,		130
(*b*) Statement of conditions found—		
Normal,	48	
Albuminuria,	17	
Induction	21	
Dublin treatment,	10	
Death of fœtus in utero,	2	
Hæmorrhage,	14	
Threatened abortion,	3	
Hyperemesis gravidarum,	2	
Pre-eclampsia,	1	
Eclampsia,	2	
Heart lesion,	3	
Chorea,	1	
Mental derangement,	1	
Miscellaneous,	5	

(*c*) Results of treatment—One case of hyperemesis gravidarum died. The case of mental derangement was transferred to Kingseat Mental Hospital. All the other cases proceeded satisfactorily under treatment.

2. *Abortions*—

(*a*) Number of cases,	28

(*b*) Results—Satisfactory in 26 cases.
Death in 2 cases—(*a*) Result of abortion.
(*b*) Died of phlegmasia alba dolens.

3. *Abnormal or Complicated Confinements*—

(*a*) Number of cases,		49
(*b*) Types of cases—		
Craniotomy,	3	
Instrumental,	20	
Pelvic,	12	
Transverse,	2	
Face,	2	
Twins,	4	
Triplets,	1	
Placenta prævia,	5	

(c) Results—One case with pelvic presentation died of acute pulmonary congestion following eclampsia. One case of instrumental delivery died of puerperal eclampsia. All the other cases proceeded satisfactorily.

4. *Other Cases of Confinement*—

(a) Number of normal deliveries,		278
(b) Number of cases delivered without medical attendance at delivery,		274
(c) Number of instrumental deliveries (exclusive of those appearing under (3)),		0
(d) Number of cases of morbidity (B.M.A. standard),		14
(e) Number of cases under (d) in which delivery was instrumental,		2
(f) Number of deaths,		11
Puerperal septicæmia,	2	
Puerperal eclampsia,	1	
Influenzal pneumonia,	2	
Pyosalpinx and general peritonitis,	1	
Acute pulmonary congestion following eclampsia,	1	
Mitral incompetence—Premature labour,	1	
Abortion,	1	
Hyperemesis gravidarum,	1	
Phlegmasia alba dolens—Embolism,	1	

5. Number of Infants—(1) Live-born, 285; (2) Still-born, 32.
Number of cases of Twins—(1) Live-born, 5; (2) Still-born, 2.
Number of cases of Triplets—(1) Live-born, 1; (2) Still-born, 0.

6. Number of Deaths of Infants under 8 days old, 10.

7. Number of cases of puerperal sepsis removed from institution, 0.

Outdoor City Cases.

Abortions—

Number of cases,	5

Results—All satisfactory.

Abnormal or Complicated Confinements—

Number of cases,		12
Types of cases—		
Instrumental,	4	
Pelvic,	4	
Transverse,	1	
Twins,	2	
Placenta prævia,	1	

Results—All satisfactory.

Other Cases of Confinement—

(a) Number of normal deliveries,	104
(b) Number of cases delivered without medical attendance at delivery,	84
(c) Number of instrumental deliveries (exclusive of complicated or abnormal confinements),	0
(d) Number of cases of morbidity (B.M.A. standard),	1
(e) Number of cases under (d) in which delivery was instrumental,	0
(f) Number of deaths,	0

Number of Infants born—(1) Live, 112; (2) Still, 4.
Number of Twins born—(1) Live, 2; (2) Still, 0.
Number of Deaths of Infants under 8 days old, 6.

Homes for Unmarried Mothers before and after Confinement.

Unmarried mothers in their second or subsequent pregnancies are admitted to Loch Street Home. This Home is centrally situated and permits mothers who are employed to continue breast-feeding. Unmarried mothers with their first pregnancy are admitted to Burnside Home. A total of 25 unmarried mothers were admitted to Loch Street Home, and 29 unmarried mothers to Burnside Home.

Hospitals for Sick Children.

The *Royal Hospital for Sick Children* is a voluntary institution, and surgical and medical cases are freely admitted there. No separate records are kept of the work done in connection with the treatment of children under 5 years of age, nor are City cases differentiated from County cases.

The *Marasmus Ward at the City Hospital* provides 22 cots for infants suffering chiefly from nutritional disorders. In all, a total of 161 infants were admitted to this ward during the year, and 159 were discharged. The conditions treated, with the results of treatment, were as follows:—

	Cases.	Improved.	Died.
Digestive System—Vomiting,	6	5	—
Enteritis,	19	17	—
Constipation.	1	1	—
Malnutrition,	97	57	35
Pneumonia,	2	—	2
Nervous System,	4	3	1
Skin,	4	4	—
Venereal Disease—Syphilis,	1	—	1
Ears discharging,	2	2	—
Tuberculosis,	3	—	2
Rickets	9	8	—
Prematurity,	2	—	2
Congenital malformations,	4	3	1
Miscellaneous	5	4	—
	* 159	104	44

* Of the above, 11 children were removed at request of parents or transferred to other wards or other hospitals, including 1 case of diphtheria transferred to the diphtheria ward of the City Hospital.

Average period of residence—45 days.

Convalescent Homes.

Burnside Home provides accommodation for 11 mothers and 25 infants. The Home is mainly utilised for the admission of married women after their confinement, with the object of providing them with rest and instruction in baby care. Loch Street Home provides accommodation for 10 mothers and 10 infants, and is mainly used for the admission of unmarried mothers both before and after confinement. Details of cases treated are as follows:—

	Burnside Home.		Loch Street Home.
Number of Cases Treated—			
Mothers,	106	...	35
Children under 1 year,	143	...	23
Children over 1 year,	10	...	28
	259	...	86
Average Duration of Residence—			
Mothers,	25 days	...	47 days
Children,	37 days	...	36 days
Note as to Infectious Disease,	1 case measles.	...	*Nil.*

BOARDING-OUT.

No arrangements are made for boarding-out City infants.

HOME-HELPS.

In all, 7 home-helps were employed for 7 cases, for an average of 17 days, to assist in the homes of mothers during their confinement. In none of the cases was it considered advisable to make a charge for these services, which cost in all £8 12s. for the year.

EDUCATIONAL.

Health Lectures for Women.—Since 1919, short courses of eight Health Lectures for women, with special reference to motherhood and infant care, have been given by senior medical practitioners in various Child Welfare Centres throughout the City. Four such courses have been delivered per annum. In 1924, four courses were given by Dr. Sandeman and Dr. P. Howie—by the former at Torry and Holburn Centres, and by the latter at Charlotte Street and Castlegate Centres. The following are the particulars of enrolment and attendance at the various Centres:—

	Number Enrolled.		Total Attendance.		Average daily Attendance.		Number making 75 per cent. of Attendances.
Torry Centre,	46	...	284	...	36	...	36
Holburn Centre,	31	...	139	...	17	...	15
Charlotte Street Centre,	39	...	162	...	20	...	12
Castlegate Centre,	16	...	52	...	7	...	3

Women making 75 per cent. of the attendances received certificates of attendance. The last course at Castlegate Centre was much interrupted by an epidemic of measles and whooping-cough among the children, so that mothers could not attend regularly.

Lectures and Demonstrations at Child Welfare Centres.—From September to June, lectures or talks of half-an-hour's duration on Motherhood and Infant Care, are given by the Child Welfare Medical Officer to mothers attending the Centres. At each Centre cooking demonstrations are given once a month by one of the Voluntary Workers, or by a Domestic Science teacher from the Education

Authority's staff, and demonstrations on dressmaking, &c., are given once a month by one of the Voluntary Workers. The attendances of the mothers at these meetings are given in the Annual Report of the Aberdeen Mother and Child Welfare Association.

AGENCIES, NOT REFERRED TO ABOVE, ASSOCIATED WITH SCHEME.

Arrangements have recently been made for closer co-operation between the Aberdeen Association for Improving the Condition of the Poor and the Maternity and Child Welfare Department.

OTHER PROVISIONS.

Cases of pneumonia are admitted to the City Hospital when the home conditions are unsatisfactory. Cases of bronchitis are similarly admitted to the City Hospital or to the Sick Children's Hospital. Cases of acute poliomyelitis are treated in the City Hospital during the acute stage of illness, and later receive out-patient treatment at the Sick Children's Hospital.

PORT SANITARY SERVICES.

A history of the trade and shipping of the Port of Aberdeen from the twelfth century to the present day, by Miss Victoria E. Clark, M.A., Carnegie Research Fellow (Wyllie & Son, Aberdeen, 1921), is now available for reference.

In the midst of a world-wide economic upheaval like the present, when it is impossible to estimate what the future has in store for Aberdeen, the great development of the Port during the past century is of special interest. The long epoch of warfare with France, culminating in the Napoleonic campaigns, had an injurious effect on the City's commerce in the early years of the nineteenth century. Once the Port was freed, however, from the embarrassment of war, a period of development set in. The thirties marked the beginning of the clipper ship era with its growth of shipbuilding and the evolution of the far-famed clipper bow giving to Aberdeen-built vessels a foremost place in the carrying trade of the world. With the passing of the sailing ship and the widespread introduction of steamers, the Port, by reason of her distance from the coal and iron fields, could not hope to compete with other towns more conveniently situated. The glory of her shipbuilding days declined, but from the eighties onwards she found fresh prosperity in the amazing growth of the fishing industry and its allied trades.

In the present post-war emergency, it is greatly to be hoped that the fishing industry, as exploited anew in the light of modern science, will again be our salvation.

Trade and Shipping.

The total foreign and coastwise shipping entering the Port during 1924 was 18,323 vessels, of which 2,184 were foreign. The total tonnage of all vessels was 1,862,754, of which 441,050 was foreign.

The British ports with which Aberdeen trades mostly include Blyth, Dundee, Grangemouth, Granton, Hull, Leith, Lerwick, Liverpool, London, Middlesborough, Newcastle, Seaham, Shields, Sunderland, Tyne, Wick, and the Orkney and Shetland Islands.

The foreign ports with which Aberdeen has most trade include Antwerp, Archangel, Drammen, Gothenburg, Hamburg, Karlshamm, Larvik, New York, Oslo, Riga, Rotterdam, and North African ports.

The principal imports to Aberdeen are of the following nature, viz.:—Cement, coals, esparto grass, fish, flax, flour, granite, hemp, iron, jute, linseed and rape seed, maize, oilcake, oils, phosphates, salts, wood, wood pulp, and cattle, pigs, and sheep.

The principal exports are as follows:—Fish, flour, granite, hides and skins, jute (manufactured), manure (manufactured), oatmeal, oats, oilcake, oils, paper and paper boxes, pitch, preserved provisions, soap, and cattle, pigs, and sheep.

Sanitary Control of Shipping.

The powers conferred on the Town Council by the Public Health Act and the Port Regulations of 1907 and 1921 to ensure that infectious diseases shall not be introduced into the City by shipping are set forth in the preceding Annual Report.

The Medical Officers available for the visitation of vessels are the Medical Officer of Health and the Resident Medical Officers of the City Hospital; and arrangements for expeditiously obtaining their services by day and night have long been in operation. The same observation applies to the Sanitary Inspector and his assistant inspectors, one of whom—a food inspector, who is also a fully qualified sanitary inspector—is charged, as part of his regular duties, with the visitation of vessels in respect of their sanitary condition as well as with the inspection of imported foods.

There has always been full co-operation between the Health Officers and the Customs Officers; and the Medical Officer of Health supplies weekly to the Chief Preventive Officer a copy of the Weekly Record of the more serious infectious diseases in foreign and home ports, so far as known. The Customs Officers inform the Health Department by telephone, of the arrival of vessels in the Port, in accordance with specified arrangements with the Medical Officer of Health. Thus, the names and position in the docks of all vessels from Baltic ports, White Sea and all Russian ports, Mediterranean and Black Sea ports, Suez and all Eastern ports, all African ports, and all American ports are telephoned to the Health Office or to the City Hospital on their arrival, together with the Customs Officers' reports on the health of the ships. So also the arrivals of vessels from other ports with sickness on board suggestive of possible infectious disease, are similarly intimated. All vessels from plague infected ports and such other vessels as the Customs' reports warrant are medically inspected. Full records of the medical inspections of the ships and their crews are kept on cards prepared for the purpose.

The nearness of the City Hospital to the Port is a great asset. There are no special premises or waiting rooms provided at the Port for the purposes of medical examination. No difficulty has been found in making such examination on board ship, or, in doubtful cases, by removal to the City or other hospital. There are no specially provided premises for the temporary accommodation of persons, sufficient accommodation, when needed, having hitherto been obtainable at the City Hospital. Hospital accommodation for infected persons is provided at the City Hospital.

Cleansing and disinfection of vessels is undertaken or supervised by members of the sanitary staff, and persons and articles requiring cleansing and disinfection are removed to the Cleansing and Disinfecting Stations attached to the City Hospital.

The destruction of rats in ships is, where required, undertaken or supervised by the rat officers of the staff.

The ambulances and other vehicles of the Health Department are available for the transport of persons or articles from vessels to the hospital and attached stations.

The existing staff has been found to be sufficient to meet normal requirements, but if additional or special assistance, medical or other, is at any time required for emergency reasons, the Medical Officer of Health is, as hitherto, empowered to obtain it.

In view of the easy access to the City Hospital from the Port, there is no indication of any need for the provision of buildings or equipment for sanitary purposes at the Port itself. Any development in connection with buildings or apparatus for port work would have reference to the provision of additional beds and other facilities at the City Hospital with a view to relieving the present congestion there.

MEDICAL INSPECTION OF SHIPPING.

The amount of shipping entering the Port during the year, distinguished as foreign and coastwise, together with the number of ships inspected and the nature of the defects and number of notices issued in connection therewith, are set forth in the following table:—

		Number of Vessels.	Tonnage of Vessels.	Number Inspected.		Number reported to be Defective.	Number of Notices issued.
				By the Medical Officer of Health.	By the Sanitary Inspector.		
Foreign—	Steamers	290	270,870	11	145	11	9
	Motor	8	1,473	...	4	...	...
	Sailing	5	627	...	2	2	1
	Fishing	1,881	168.080	...	3	2	...
Total Foreign		2,184	441,050	11	154	15	10
Coastwise—	Steamers	1,927	567,258	1	141	14	11
	Motor	25	9,005	...	3	...	...
	Sailing	7	816	...	2	1	...
	Fishing	14,180	845,625	2	10	5	3
Total Coastwise		16,139	1,421,704	3	156	20	14
Total Foreign and Coastwise . .		**18,323**	**1,862,754**	**14**	**310**	**35**	**24**

It will be seen that of the 18,323 vessels entering the Port, 16,061 were fishing vessels. In general, it may be said that the danger of fishing vessels importing infectious disease is largely confined to vessels from English or German ports introducing small-pox or other infectious diseases from these countries. The main sanitary control of fishing vessels has reference to remedying sanitary defects and verminous conditions. Arrangements have been made whereby the sanitary control of fishing vessels will be extended with special reference to dealing with verminous conditions.

With reference to foreign and coastwise shipping other than fishing vessels, the chief danger is the risk of the introduction of grave epidemic disease such as plague by foreign shipping; but infectious disease may also be introduced by coastwise shipping, and particularly at the present time the danger of coastwise shipping introducing small-pox from England is causing serious and justifiable concern.

In all, 18 persons, from 11 vessels, were removed to hospital for observation or treatment during the year. In January, a case of typhoid fever complicated with a tape-worm infection of the dibothriocephalus latus type, was removed from a steamer from a Baltic port, and has already been referred to in the section of this Report dealing with Infectious Diseases. In September, 5 small-pox contacts were removed from one of the Aberdeen, Newcastle, and Hull Steam Company's vessels sailing between Aberdeen and Hull. A case of small-pox which had occurred on this vessel was recognised only after the passenger had proceeded to her home in Yorkshire, and another passenger who had been in contact with this case later developed the disease. Full details of this case of small-pox and the action taken to prevent the spread of infection are given in the section of the Report dealing with infectious diseases. In November, a case of small-pox was admitted to hospital from a trawler which had come into Aberdeen to dispose of its fish, the patient, a fisherman, having contracted the infection in his home in Scarborough. Full details of this case and of the action taken to prevent the spread of infection are also given in the section of the Report dealing with infectious diseases. In September and October two cases of illness with symptoms of carbon-monoxide poisoning were removed from trawlers entering the Port, and both these cases were admitted to the City Hospital for observation. The poisoning was due to fumes from the exhaust of the motor engines gaining access to the men's sleeping quarters. Both cases recovered rapidly. Nine cases of scabies were found among the crews of six trawlers entering the Port during the year, and in all these cases the patients and their belongings were removed to the City Hospital for disinfestation, the quarters in the trawlers occupied by the patients being also disinfested.

RAT DESTRUCTION—PRECAUTIONS AGAINST PLAGUE.

The methods of rat destruction employed in connection with shipping and in connection with the Port and the City of Aberdeen generally are fully described in the section of this Report dealing with infectious diseases. In general it may be said that in Aberdeen red squills has superseded the use of other chemical poisons and of virus in preparing poison baits for rats. In using poison baits for purposes of rat destruction, it is impossible to get any accurate measure of the number of rats destroyed, since a large number of the poisoned rats commonly migrate before death and the surviving rats frequently desert the places in which poison baits are laid. Trapping of rats within the area of the Harbour Commissioners is regularly carried out, and these rats are submitted to laboratory examination for plague. In all, 100 rats were thus examined in Aberdeen during 1924, but no laboratory evidence of plague infection in the rats was obtained.

The following measure of the work on rat destruction carried out by the two whole-time rat-catchers of the Health Department is submitted:—

Number of pieces of poison bait laid, ...	64,224
Number of pieces of poison bait eaten, ...	21,639
Liquid poison laid, ...	6 pints
Liquid poison consumed, ...	5 pts. 12½ oz.

Dry poison bait (mice) laid,	45½ ozs.
Dry poison bait (mice) eaten,	6¾ ozs.

In addition, liquid poison in the form of red squills was sold by the Health Department to occupiers of business premises and dwelling-houses within the City. The quantity sold amounted to 24 gallons, sufficient for the making up of 45,720 baits; and from the returns obtained from the purchasers it would appear that approximately 32 per cent. of the baits were eaten.

Three ships from plague-infected ports entered Aberdeen during the year:—

Name of Vessel.	Date of Arrival.	Where from.
"Tabor,"	22nd June,	Bombay
"Vellavia,"	1st October,	Calcutta
"York Castle,"	26th December,	Bombay

None of these vessels from plague-infected ports was either infected or suspected, nor was there any evidence obtained, on inspection or on inquiry at the masters or among the crews, that the ships were rat-infested. As the ships had been fumigated in European ports and had called at English ports on their way to Aberdeen, no deratisation measures were instituted.

In all, four vessels (not from plague-infected ports) in which evidence was obtained that rats were present on board were dealt with, poison baits to the number of 320 being laid, 36 of these being removed by rats. Fumigation of these vessels was not employed.

No certificates of fumigation were issued on Form Port 10 in connection with any vessels proceeding to U.S.A. ports.

Precautions in connection with clean ships calling at the Port of Aberdeen, with a view to preventing the ingress of rats to the ships, have been defined, and it has now been ascertained that the regulations dealing with the precautions to prevent the ingress of rodents, to be observed by vessels trading with the Port of New York and other ports in the United States, require that when a vessel has entered the port under the terms of a provisional pratique it shall be fended off a distance of at least four feet from the wharf.

VETERINARY SERVICES.

The activities of the Health Department that are subject for discussion under "Veterinary Services" relate mainly to the control of food supplies, the executive officers for this purpose being the Veterinary Inspector and the Sanitary Inspector who is also Food Sampling Officer.

Milk Control.

By far the greatest achievement in relation to the hygiene of food that falls to be recorded since food supplies were subjected to modern sanitary supervision has been the provision of Certified milk, which was first placed on the Aberdeen market in October, 1924, by Major Keith of Cairnbrogie and Bonnyton, Aberdeenshire.

CERTIFIED MILK.

Under the Milk and Dairies (Amendment) Act, 1922, the powers of the Local Authority regarding the registration of purveyors of milk are greatly increased. Under the Act, the Local Authority are now required to keep two registers of milk vendors—one for wholesale suppliers and the other for retail purveyors of milk. In the Dairies, Cowsheds, and Milkshops Order of 1885, under which the Local Authority had hitherto registered milk vendors, the Local Authority were not empowered to refuse registration or to remove any person from the register. Power to refuse registration or to remove from the register is now granted to the Local Authority, controlled by appeal to the Sheriff.

Power is given to Local Authorities to grant licences for the sale of milk of special bacterial purity and certain chemical composition under the Milk (Special Designations) Order (Scotland), 1922, made by the Scottish Board of Health under Sections 3 and 14 of the Milk and Dairies (Amendment) Act. Section 5 of the Act prohibits, under high penalty, the sale of milk from a cow suffering from tuberculosis of the udder. Under the Milk (Special Designations) Order, four grades or designations of milk are recognised by the Board of Health:—

1.—*Certified Milk.*—Milk from a herd which has passed the prescribed tuberculin tests; which contains not more than 30,000 bacteria per cubic centimetre; which contains no coliform bacillus in one-tenth of a cubic centimetre; which contains at least 3·5 per cent. of butter fat; which has not at any stage been treated by heat; and which has been cooled and bottled in sterilised bottles on the producer's premises and is so delivered in sealed bottles to the consumer.

2.—*Grade A (Tuberculin Tested) Milk.*—Milk from a herd which has passed the tuberculin tests; which contains not more than 200,000 bacteria per cubic centimetre; which contains no coliform bacillus in one-hundredth of a cubic centimetre; which contains at least 3·5 per cent. butter fat; which has not at any stage been treated by heat; and which is delivered in sealed containers or in sterilised bottles similarly sealed.

3.—*Grade A Milk.*—Milk from a herd which has been examined clinically at least three times a year by a Veterinary Surgeon nominated by the Local Authority. This Grade should also contain not more than 200,000 bacteria per cubic centimetre; no coliform bacillus in one-hundredth of a cubic centimetre, and at least 3·5 per cent. butter fat; should not at any stage be treated by heat; and should be delivered in sealed containers or in sterilised bottles similarly sealed.

4.—*Pasteurised Milk.*—Milk which has been retained for at least half an hour at a temperature between 145° and 150° F., and has thereafter been immediately passed to a covered cooler and the temperature reduced to 50° F. or less. Such milk need not contain 3·5 per cent. butter fat, but must not contain more than 30,000 bacteria per cubic centimetre, and must contain no coliform bacillus in one-tenth of a cubic centimetre.

The Act makes it an offence to sell milk under these designations without a licence which is issued by the Local Authority. In terms of the Minutes of Council of 8th October, 1924, two firms of milk retailers, viz., the Aberdeen Dairy Company, Ltd., and Mr. John Bain, 22a, Broomhill Road, were licensed to sell Certified milk, which was thus put on the market for the first time in Aberdeen.

It is of the utmost importance that the public should know what is meant by the term "Certified Milk." In the first place Certified milk comes from a "licensed herd"—that is, from a herd free from tuberculosis as tested by the tuberculin test and in which the cows are regularly examined by the Veterinary Inspector and retested by the tuberculin test at definite intervals. It follows that Certified milk from such a licensed herd is free from the infection of tuberculosis, and the enormous benefit of this freedom from infection will be appreciated when account is taken of the extent of tuberculous infection in ordinary milk and of the disease and death caused by it. Thus, an average of five per cent. of all milk samples as at present delivered in Aberdeen contain tubercle bacilli, the presence of tubercle bacilli in these milk samples being proved by the development of tuberculosis in guinea-pigs inoculated with the milk. Not only so, but it is found that an average of 20 deaths occur in Aberdeen each year as a result of infection with tubercle bacilli of the bovine type, the great majority of these deaths occurring in children, and in every case the infection is derived from drinking cow's milk infected with the tubercle bacillus. It will readily be understood that these deaths are only an index of the amount of disease caused by tuberculous milk. The cases of tuberculosis caused by infected milk are about twenty times the number of deaths. Apart from its freedom from tuberculous infection, Certified milk has the additional great advantage of being free from dirt in general, and especially of being free from the intestinal bacteria contained in cow's dung. Thus Certified milk contains no colon bacilli even in one-tenth of a cubic centimetre; ordinary sweet milk commonly contains hundreds of colon bacilli in a cubic centimetre. Finally, Certified milk must contain at least 3·5 per cent. of milk fat; the fat standard of ordinary milk is 3·0 per cent.

In discussing the value of milk in the diet, it has to be recognised that milk is altogether unique in its great food value. There is no other food or combination of foods that can take its place, and especially is this the case in the diet of children and invalids. Milk is pre-eminent among foods in promoting growth and increasing resistance to disease. Nevertheless, until Certified milk was made available, many physicians hesitated to urge their patients to drink milk, and then only when it was boiled. While well aware of its unique food value, how could physicians urge an increased consumption of milk when they knew that an average of five out of every hundred milk deliveries to the houses of their patients contained virulent tubercle bacilli, and that the dirt content of ordinary sweet milk was such as frequently to constitute simply an emulsion of excretal organisms from the cow.

All that has been changed with the coming of Certified milk. Certified milk in its freedom from tuberculous infection, freedom from dirt, and increased fat content, is easily the most valuable food extant. It was on recognising this great truth that the Town Council in October, 1924, decided to authorise the use of Certified milk in all the Public Health institutions in the City. These include the City Hospital, Burnside Home for Mothers and Babies, Loch Street Home for Mothers and Babies, and the Charlotte Street Day Nursery. At the same time the Council authorised that Certified milk only should be supplied to all mothers and children obtaining milk in their homes from the Health Department, and also to all tuberculous patients similarly receiving milk in their homes.

With a view to encouraging the production of Certified milk, the Aberdeen dairymen have been informed that the Town Council contract will necessarily be given to dairymen retailing it. At the same time, producers of milk in the Aberdeen area, have been assured that the Health Department will do everything in its power to assist them should they be prepared to supply Certified milk. Thus, whenever a dairyman is prepared to supply Certified milk, the Public Health Department is prepared to analyse the milk samples twice weekly, free of charge, and to send the results of the analyses, both chemical and bacteriological, to the milk producer for his guidance. The milk producers have also been informed that they will be given a period of some six months in which to adjust their production of milk, so that it meets the certified standard, without any interference from the Health Department apart from helpful advice. The milk producer who at present holds the Aberdeen Town Council contract for Certified milk is using the bacteriological counts, as supplied by the Health Department, to form the basis of the bonus system on which he pays his workers. Thus, the milk counts as sent to the milk producer are posted on a notice-board every week at the two farms producing the milk, for the information of the workers, who receive a bonus to their wages, descending in amount according as the count of the milk ascends from under 5,000, under 10,000, under 15,000 organisms, and so on.

Another factor that weighed with the Town Council in authorising the use of Certified milk was the belief that this official action would encourage the production of Certified milk and serve as an example to the whole community with a view to the use of Certified milk becoming general. That progress in this direction has been slow is due to two main causes. The chief cause is that the great hygienic value of Certified milk is not yet generally recognised, the extent of tuberculous infection arising from ordinary sweet milk not being fully realised. The second cause militating against its use is the present price of Certified milk. As retailed in sealed bottles, Certified milk costs 5d. per pint in Aberdeen, as against 2½d. per pint for ordinary market milk. This is a serious matter, but it can be definitely stated that milk vendors will be able to reduce the price whenever the demand for Certified milk is anything like general. Even at the present prices, Certified milk is much better value than ordinary milk. The point need not be laboured. A clean rich milk free from tuberculous infection is the finest food attainable, and I am satisfied that when all the facts concerning milk and milk infection are generally known, the citizens of Aberdeen will demand clean milk. At present the Public Health institutions of the City use 72 gallons of Certified milk daily, while private citizens use a total of 30 gallons daily.

MARKET MILK.

The policy of the Public Health Department is to secure the general use of Certified milk, and towards that end every effort continues to be made to raise the standard of cleanliness of ordinary market milk. For several years it has been the practice of the Health Department to subject market milk as retailed in Aberdeen to frequent analysis, both bacteriological and chemical, and to communicate the results of the analyses to the dairymen concerned within the City and to the Medical Officers of Health of all the counties producing milk for Aberdeen. These Medical Officers issue copies of these laboratory returns to the Sanitary Inspectors of the different districts, who communicate the results to the various producers. The Sanitary Inspectors find this information most useful in their dealings with the producers, many of whom on the basis of these returns have entered into a healthy rivalry with their neighbours in endeavouring to lower the bacterial counts of their milks.

Bacteriological Examination of Milk Samples.

Year.	TUBERCLE.			GENERAL BACTERIA—No. in 1 c.c.							
	No.	Pos.	Neg.	No.	Not exceeding						Exceeding
					10,000.	50,000.	100,000.	250,000.	1,000,000.	5,000,000.	5,000,000.
1924	**176**	**9**	**167**	**274**	**14**	**106**	**54**	**25**	**46**	**15**	**14**
1923	230	13	217	392	23	113	78	46	83	35	14
1922	219	11	208	478	18	140	70	63	104	55	28
1921	86	7	79	294	25	70	37	46	65	26	25
1920	165	6	159	298	42	67	22	33	44	40	50

All the milk samples for laboratory analysis are taken from the milk consignments immediately on their delivery from the producers at the City dairies. In 1924, a total of 176 milk samples were examined for the presence of tubercle bacilli, and reference to the accompanying table shows that tubercle bacilli were present in 9 of the samples, or 5·1 per cent. Of 230 samples examined in 1923, 5·7 per cent. contained tubercle bacilli; and of 219 samples examined in 1922, 5·0 per cent. contained tubercle bacilli. As regards the general bacterial examination of market milk, a total of 274 samples were examined during 1924, and the table shows that 174 of these samples, or 63·5 per cent, as compared with 44·0 per cent. in 1920, did not contain more than 100,000 organisms per cubic centimetre. On the basis of not more than 100,000 organisms per cubic centimetre of milk being taken as a standard of cleanliness for market milk, it would appear that within a period of four years there has been a 20 per cent. improvement in the cleanliness of ordinary sweet milk. This is a very considerable achievement.

A record of the work done during 1924 in connection with the chemical examination of market milk is contained in the annual report of the Sanitary Inspector, and it may be said that as compared with the milk retailed in other cities in Scotland the chemical quality of Aberdeen milk is of a high order.

Dairy Herds.

The number of dairy herds in the City is showing a gradual decline. During 1924, there were only nineteen herds, the average number of cows being 190. The herds were inspected once a month. During the year two samples of milk were taken for examination from cows with induration of the udder, but in neither case was the result of microscopical examination or animal inoculation positive for tubercle bacilli. The sanitary condition of the premises was, on the whole, satisfactory.

Producer Record System.—The expert advice of the Veterinary Inspector is always at the service of milk producers in the City and in the Aberdeen area generally. In this connection the cordial co-operation which exists between the Health Department of the City and the adjacent Counties is of great assistance in the effort to secure a cleaner milk supply. Thus, in the county districts generally as well as in the City, the Veterinary Inspector is year by year obtaining closer contact with milk producers, with the result that an increasing use is being made of the Producer Record system of the Health Department with the best results.

The Producer Record cards issued from the Department on request cover the whole range of the requirements of clean milk production, and there is no doubt that the increasing interest taken in these records has been an important factor in securing the improvement in the cleanliness of the Aberdeen milk supply which the laboratory returns show.

Recently an educational effort in the form of a clean milk competition among producers has been undertaken in Edinburgh, the competition extending over a six months' period, during which the inspectors conducting the competition keep score cards recording the varying efficiency of each producer's methods as found at each monthly inspection.

Such milk competitions can only do good in stimulating and directing the efforts of the producers concerned to provide clean milk, and they have the additional advantage of stimulating public interest in clean milk production; but milk competitions are to be regarded as ancillary measures in the fundamental work of the Veterinary Department in regularly providing milk producers with expert advice and laboratory services.

Meat Control.

HUMANE SLAUGHTERING OF ANIMALS.

With reference to the vexed question of the humane slaughtering of animals, it is important that the attention of the Town Council should be directed to a Joint Report on the Humane Slaughtering of Animals, by the Medical Officer of Health of the City of London, the Superintendent and Chief Veterinary Inspector of the Metropolitan Cattle Market, and the Veterinary Surgeon of the City of London Central Meat Market. Clause 9 (B) of the Ministry of Health's Model Bye-laws relating to Slaughter-houses is to the effect that—

"A person shall not in a slaughter-house proceed to slaughter any animal until the same shall have been effectually stunned, and such stunning shall, except as hereinafter provided, be effected with a mechanically operated instrument suitable and sufficient for the purpose.

"Provided that this Bye-law, so far as it would require the stunning of sheep and the use of a mechanically operated instrument, shall not apply until the expiration of three months from and after the date of the confirmation of these Bye-laws.

"Provided, further, that this Bye-law shall not be deemed to apply to any member of the Jewish Faith, duly licensed by the Chief Rabbi as a slaughterer, when engaged in the slaughtering of cattle intended for the food of Jews according to the Jewish method of slaughtering, if no unnecessary suffering is inflicted."

In the Memorandum which prefaces these Model Bye-laws the following observations are made:—

"*Prevention of Cruelty.*

"It is hardly necessary to urge that all animals be slaughtered by the most painless and effective methods, but it may be desirable to point out that the prevention of cruelty in slaughter-houses by means of Bye-laws is one of the specific duties which have been imposed upon Local Authorities by the Legislature, and the Board have always attached much importance to the making and enforcement of Bye-laws for this purpose."

In the Joint Report above referred to, it is recommended—

"1. That Bye-law 9 (B) be adopted by the Corporation, and that it should apply to:—

(*a*) Cattle, including calves;
(*b*) Horses;
(*c*) Pigs, the flesh of which is to be consumed as fresh pork.

"2. *Sheep.*—We are unable to agree as to a recommendation in the case of sheep, and submit a rider herewith.

"3. We recommend that further enquiries and experiments be made in respect of the objections which others have submitted to the effect that the use of the mechanical apparatus prejudicially affects the preparation of bacon, if additional information is desired on this subject. We estimate that the cost of such enquiry would not exceed £150.

"4. If Bye-law 9 (B) is adopted, we recommend that the use of a mechanically operated instrument of the captive-bolt type be specified, to the exclusion of one releasing a bullet.

"5. If Bye-law 9 (B) is made compulsory, we consider that classes of instruction should be established for the purpose of educating slaughtermen in (*a*) simple anatomy of the skull of different animals, and (*b*) in the proper use and care of the instrument.

"6. If it be practicable, after Bye-law 9 (B) is adopted, we would suggest that no person should be permitted to slaughter in any slaughter-house within the jurisdiction of the City Corporation until certified by one of your officials as having a competent knowledge of (*a*) and (*b*) above."

In considering the whole question of humane slaughter, the Corporation of London passed a Resolution generally supporting the principles of the Ministry of Health's Model Bye-law 9 (B), and urging the Government, in order to secure uniformity, to issue compulsory Regulations applicable throughout the country.

The Joint Report on the Humane Slaughtering of Animals is of a comprehensive description and includes the results of much experimental investigation, and having examined all the evidence submitted, Mr. McAllan, the Veterinary Inspector, and myself desire to put on record our considered opinion, viz.:—*that the time is now opportune for the Scottish Board of Health to issue compulsory regulations of general application throughout the country making the use of a mechanically operated instrument of the captive-bolt type obligatory for the stunning of all animals prior to slaughter.*

MEAT INSPECTION.

The improvement in meat inspection and control which was referred to in my previous Annual Report has been maintained during the year, and the Meat Inspection Regulations continue to be worked harmoniously. There are five slaughter-houses in the City, and, as has been pointed out in the preceding Report, it is impossible to secure adequate inspection of meat in five widely separated slaughter-houses.

The number and class of animals killed in the five slaughter-houses during the year were as follows:—

Cattle.					Sheep.		Pigs.
Oxen.	Heifers.	Cows.	Bulls.	Calves.	Sheep.	Lambs.	
26,087	16,540	653	430	60	43,592	3,979	3,314

SEIZURES IN SLAUGHTER-HOUSES.

NAME OF SLAUGHTER-HOUSE.	NUMBER OF ANIMALS SLAUGHTERED.				A. SEIZURES FOR ALL CAUSES (INCLUDING TUBERCLE).								B. SEIZURES FOR TUBERCLE ONLY.							
					NUMBER OF CARCASES SEIZED (WHOLE OR PART).								NUMBER OF CARCASES SEIZED (WHOLE OR PART).							
	Cattle.	Calves.	Sheep.	Pigs.	Cattle.		Calves.		Sheep.		Pigs.		Cattle.		Calves.		Sheep.		Pigs.	
					Whole	Part.	Whole	Part.	Whole	Part.	Whole	Part.	Whole	Part.	Whole	Part.	Whole	Part.	Whole	Part.
Hutcheon Street .	32,558	58	35,958	3,248	198	443	7	3	34	29	42	114	128	211	1	...	...	...	17	80
Charles Street .	1,829	...	1,744	...	3	32	...	...	...	...	...	...	3	11	...	...	...	...	...	...
Deer Road . .	4,368	...	2,982	14	12	77	...	...	...	...	1	2	12	62	...	...	...	...	...	2
Western Road .	2,237	2	2,497	11	9	42	1	1	6	1	...	1	6	28	0	1	...	...	...	1
Canal Place .	2,718	..	4,390	41	8	88	...	...	...	...	...	...	8	76	...	...	...	...	...	...
Totals for 1924 .	43,710	60	47,571	3,314	230	682	8	4	40	30	43	117	157	388	1	1	...	...	17	83
Corresponding Totals for 1923	44,036	72	39,144	2,210	215	500	3	4	40	8	27	78	162	350	...	...	...	...	9	46
Percentages of Seizures to Animals slaughtered in 1924					0·53	1·56	13·33	6·67	0·08	0·06	1·30	3·53	0·36	0·89	1·67	1·67	...	...	0·51	2·50
Corresponding Percentages for 1923 . . .					0·49	1·14	4·17	5·56	0·10	0·02	1·22	3·53	0·37	0·79	...	...	...	...	0·41	2·08

The following table gives the number of carcases inspected and the weight of meat seized as unfit for human food during the year:—

	Oxen.	Bulls.	Cows.	Heifers.	Calves.	Sheep.	Pigs.
Number of carcases inspected,	*	430	653	*	60	*	3,314
Number of carcases seized wholly—							
(1) For tuberculosis,	38	0	80	39	1	0	17
(2) For other diseases,	7	2	57	7	7	40	26
Number of carcases of which portions were seized—							
(1) For tuberculosis,	192	2	49	145	1	0	83
(2) For other diseases,	77	2	183	32	3	30	34
Total weight of meat seized,	65,820 lbs.	2,604 lbs.	101,811 lbs.	57,755 lbs.	1,198 lbs.	2,029 lbs.	6,519 lbs.

* Accurate figures as to the number of oxen, heifer, and sheep carcases inspected are not available. With five slaughter-houses to visit, it is impossible, as a routine, to inspect every carcase in detail. Every ox, heifer, or sheep carcase showing evidence of disease is, of course, thoroughly examined, and all carcases of bulls, cows, calves, and pigs are inspected.

There are two large wholesale meat marts in Aberdeen to which carcases are consigned from County districts. As a routine all such carcases are inspected by the Meat Inspector in Aberdeen, and the following table gives the number of carcases and the weight of meat seized as unfit for human food in these marts:—

	Oxen.	Bulls.	Cows.	Heifers.	Calves.	Sheep.	Pigs.
Number of carcases seized wholly—							
(1) For tuberculosis,	3	0	7	6	0	0	5
(2) For other diseases,	11	1	24	9	2	45	12
Number of carcases of which portions were seized—							
(1) For tuberculosis,	8	1	19	6	0	0	31
(2) For other diseases,	53	3	114	36	7	76	10
Total weight of meat seized,	9,985 lbs.	1,532 lbs.	22,680 lbs.	7,567 lbs.	333 lbs.	1,702 lbs.	3,132 lbs.

On page 169 will be found a table setting forth the total number of animals slaughtered and the number of carcases seized in whole or in part in the five slaughter-houses in Aberdeen during the year 1924, with comparative figures for 1923. In no case were legal proceedings necessary before diseased meat was destroyed.

Control of Other Foods.

In addition to the control of milk and milk food products, and of meat, the Health Department continues an extensive supervision of other foods. Thus, the Fish Market is visited daily, and the quantity of fish destroyed as unfit for human food in 1924 was 59,554 lbs., as compared with 9,588 lbs. in 1923. The sale of fruit and vegetables, both wholesale and retail, is also under extensive supervision. So also considerable attention continues to be paid to the inspection of tinned foods, and all factories where such articles are prepared are regularly visited. Provision curing yards, wholesale warehouses, and shops are also subject to routine visitation.

LABORATORY SERVICES.

The enormous advantage of having the Public Health Laboratories of the City in physical association with the City Hospital need not be emphasised. In the section of this Report dealing with the City Hospital Services it has been made clear how the hospital services permeate every department of public health activity, and this is due largely to the ramifications of the laboratory services. If advance is to be made, experimental medicine and clinical medicine must go hand in hand.

The conception of the function of municipal laboratories as being confined to the diagnosis of infections and to the work of the public analyst is entirely antiquated, and modern municipal laboratories are required to provide not only the bacteriological and biochemical services required for the diagnosis, treatment, and prevention of disease in its widest sense, but to be essentially experimental in nature and fundamental in their physico-chemical basis, having for their essential aim research into the ultimate causes of disease and its prevention, the conditions of health, and all the problems of rehabilitation and resistance.

In order to indicate the extent to which the Town Council have made available, free of charge, laboratory services and supplies of vaccines, sera, and other therapeutic substances to medical practitioners within the City, the following summary of these facilities was prepared and issued in card form :—

CITY OF ABERDEEN—HEALTH DEPARTMENT.

CITY HOSPITAL LABORATORY.

(Telephone No. 2242 Central, Aberdeen.)

Laboratory Services and Supply of Sera and Vaccines.

Bacteriologist, . . .	JOHN SMITH, M.D., D.P.H.
Chemist, ...	ALEX. B. WEIR, B.Sc., A.I.C.

GENERAL DIRECTIONS.

1. Each specimen must be accompanied by a written statement of :—
   (*a*) Name and address of sender.
   (*b*) Nature of examination required.
2. Specimens should be addressed to—
   The Laboratory, City Hospital, Aberdeen.
3. Outfits will be supplied on application, and an outfit will always be returned in place of one sent.
4. Reports will be telephoned or telegraphed where there is any urgency, or where the medical practitioner makes such a request.
5. Postal Regulations—
   "Deleterious liquids or substances . . . may be sent for medical examination . . . *by Letter Post and on no account by Parcel Post,* under the following conditions :—Any such liquids must be enclosed in a receptacle, hermetically sealed or otherwise closed, which receptacle must itself be placed in a strong wooden, leather, or metal case in such a way that it cannot shift about, and with a sufficient quantity of some absorbent material (such as sawdust or cotton wool) so packed about the receptacle as absolutely to prevent any possible leakage from the package in the event of damage to the receptacle. The packet so made up must

be conspicuously marked 'Fragile—With Care,' and bear the words 'Pathological Specimen.' Any packet of the kind found in the Parcel Post or found in the letter Post not packed and marked as directed will be at once stopped, and destroyed with all its wrappings and enclosures. Further, any person who sends by post a deleterious liquid or substance for medical examination or analysis, otherwise than as provided by these regulations, is liable to prosecution."

EXAMINATIONS.

1. *Throat and Nose Swabs*—
   - (*a*) Microscopical and cultural examination for B. diphtheriæ.
   - (*b*) Microscopical and cultural examination for other pathogenic organisms.
2. *Sputum*—
   - (*a*) Microscopical examination for tubercle bacilli.
   - (*b*) Microscopical and cultural examination for other organisms.
   - (*c*) Typing of the pneumococcus in cases of pneumonia where serum treatment is contemplated.
3. *Pus*—
   - (*a*) Microscopical examination for tubercle bacilli.
   - (*b*) Microscopical and cultural examination for other organisms.
   - (*c*) Microscopical examination of smears from urethral, vaginal, or eye discharges for gonococci.
4. *Blood*—
   - (*a*) Microscopical examination of blood film.
     - Examination of red cells and differential leucocyte count.
     - Examination for malaria and other parasites.
   - (*b*) Enumeration of red cells and leucocytes.
     - Estimation of hæmoglobin.
   - (*c*) Examination by blood culture.
     - (Blood which is allowed to clot in a tube is of little value for blood culture. For obtaining blood samples, the "Hyposol" vacuum extractor containing nutrient bouillon will be issued on demand.)
   - (*d*) Serum reactions.
     - Widal reaction for B. typhosus, B. paratyphosus A., and B. paratyphosus B.
     - Serum agglutination for food poisoning or other organisms.
     - Serum agglutination for B. dysenteriæ.
     - Wassermann and Sigma reactions.
   - (*e*) Chemical examinations.
     - Estimation of blood urea.
     - Estimation of blood sugar.
     - Glucose tolerance test.

     For the estimation of blood urea and blood sugar, the oxalated blood sample must be brought to the Laboratory within thirty minutes of taking the specimen. Practitioners resident in the country may send specimens for blood sugar estimations by post, but the blood must have added to it sufficient formalin to give a concentration of 0·05 per cent. Special outfits and full instructions will be issued on demand.

     For the glucose tolerance test, it is advisable, after making an appointment, to send the patient to the Laboratory.

5. *Urine*—
   - (*a*) Microscopical examinations.
     - Microscopical examination of the centrifuged deposit.
     - Microscopical examination for tubercle bacilli.
     - Microscopical and cultural examination for organisms.
       - Urines from female patients must be catheter specimens.
   - (*b*) Chemical analysis.
     - Qualitative analysis.
     - Quantitative analysis.
       - Urines for chemical examination should be preserved by the addition of a few drops of chloroform.
6. *Fæces*—
   - (*a*) Examination for intestinal worms.
   - (*b*) Microscopical examination for the ova of intestinal parasites.
   - (*c*) Microscopical examination for amœba histolytica or other protozoa.
   - (*d*) Cultural examination for organisms of the typhoid, dysentery, and food poisoning groups.
   - (*e*) General bacteriological examination.
   - (*f*) Chemical examination.
7. *Cerebro-Spinal Fluid*—
   - A complete examination to include protein test, enumeration of cells, differential cell count, colloidal gold test, microscopical and cultural examination for organisms, and Wassermann reaction as required.
8. *Water Samples*—
   - Full bacteriological examination.
   - Full chemical examination.
9. *Milk Samples*—
   - Bacterial count.
   - Cultural tests for B. coli.
   - Chemical examination.
10. *Animal Inoculation for Diagnosis*—
    - Pus, sputum, and urine for tubercle bacilli.
    - Milk for tubercle bacilli.
    - Pathological material for B. anthracis.
    - Investigation for presence of anthrax spores.
11. *Autogenous Vaccines*—
    - The cultivation and isolation of micro-organisms and the preparation of autogenous vaccines is undertaken from pathological material, collected from lesions of any specific infection.

Supply of Vaccines, Sera, and Other Therapeutic Substances.

The following biological products are issued by the Health Department free of charge to City Practitioners, and are obtainable at the City Hospital Laboratory or from the Chief Resident Medical Officer :—

1. Vaccine Lymph.
2. T.A.B. Vaccine.
3. Diphtheria Antitoxin.
4. Tetanus Antitoxin.
5. Sclavo's Serum—Anti-anthrax.
6. Anti-dysentery Serum—Polyvalent.
7. Anti-meningococcus Serum—Polyvalent.
8. Anti-pneumococcus Serum—Type 1.
9. Anti-streptococcus Serum—Polyvalent.

10. Anti-streptococcus Serum—Puerperal.
11. Anti-streptococcus Serum—Scarlatina.
12. Anti-streptococcus Serum—Erysipelas.
13. Normal Horse Serum.
14. Botulinus Antitoxin.
15. Tuberculin.
16. Schick Test—Diphtheria toxin and heated toxin.
17. Diphtheria Prophylactic—Toxin Antitoxin.
18. Dick Test—Scarlatinal streptococcus toxin and heated toxin.
19. Scarlatina Prophylactic—Streptococcus toxin in 500, 1,000, and 1,500 skin doses.
20. Insulin.
21. Salvarsan substitutes.

J. PARLANE KINLOCH,
Medical Officer of Health.

It will be seen that provision is made for any bacteriological or chemical examination in reason, the aim of the Department being to provide every laboratory facility for the prevention, diagnosis, and treatment of disease. In view of the newer methods that are available for the diagnosis and treatment of metabolic diseases, attention is directed to the chemical examinations of the blood, which are indicated in section 4, sub-section (*e*), of the card.

The following statement gives in detail the number and results of examinations for the City of Aberdeen (including City Hospital) carried out in the City Hospital Laboratories during the year:—

LABORATORY EXAMINATIONS FOR CITY OF ABERDEEN.

	Positive.	Negative.	Total.	Grand Total.
Diphtheria,	744	7,685	8,429	8,429
Tuberculosis—				
Sputum,	853	2,315	3,168	
Urines,	1	97	98	
Fæces,	3	27	30	
Cerebro-Spinal Fluids,	19	5	24	
			——	3,320
Typhoid—				
Widals,	12	42	54	
Blood Cultures,	2	7	9	
Fæces,	4	159	163	
Urines,	11	115	126	
			——	352
Para-typhoid A and B—				
Widals,	3	91	94	
Blood Cultures,	0	3	3	
Fæces,	5	16	21	
Urines,	6	14	20	
			——	138
Bacillary Dysentery—				
Agglutinations,	2	4	6	
Fæces,	2	30	32	
			——	38
Carry forward,				12,277

	Positive.	Negative.	Total.	Grand Total.
Venereal Diseases— *Brought forward,*				12,277
Wassermann Tests,	79	256	335	
Gonococcal Examinations,	70	326	396	
Spirochæte Examinations,	0	2	2	
				733
Epidemic Cerebro-Spinal Meningitis—				
Cerebro-Spinal Fluids,	8	4	12	12
General—				
Urines for Bacteriological Examination,			93	
Sputum for Organisms,			91	
Pus for Organisms,			80	
Fæces for Organisms,			14	
Fæces for Protozoal Examination,			17	
Throat and Nose Swabs for Organisms,			140	
Ophthalmia Neonatorum,			49	
Cerebro-Spinal Contacts,			9	
Blood Cultures,			55	
Blood Counts,			5	
Differential Cell Counts,			32	
Vaccines,			94	
Malaria,			12	
Rideal Walker,			1	
Cerebro-Spinal Fluids,			59	
				751
Biochemical Estimation—				
Blood Sugar,			34	
Urinary Sugar,			45	
Sugar in Cerebro-Spinal Fluid,			2	
Blood Urea,			5	
Urine Urea,			3	
Milk (Human),			3	
Fæces, &c.,			2	
				94
Water, Food, and Drug Samples—				
Bacteriological Examination of Waters,			208	
Bacteriological Examination of Milks,			305	
All Samples analysed under the Sale of Food and Drugs Acts,			1,328	
				1,841
Animal Experiments—				
Guinea-pigs inoculated with milk deposits for tubercle bacilli,			187	
Guinea-pigs inoculated with human material for tubercle bacilli,			31	
Guinea-pigs inoculated with hides for B. Anthracis			7	
Guinea-pigs inoculated with pus for B. Tetani,			4	
Guinea-pigs inoculated with catgut for B. Tetani,			5	
Guinea-pigs inoculated with tissue extracts for leptospira icterohæmorrhagica,			120	
Guinea-pigs inoculated for virulence tests for B. diphtheriæ,			9	
Rabbits inoculated with variola and vaccinia virus for Paul test,			6	
Mice used in typing pneumococci,			22	
Carry forward,				15,708

	Total.	Grand Total.
Brought forward, ...		15,708
Mice inoculated with tissue extracts for leptospira icterohæmorrhagica, ...	10	
Mice inoculated with pus for B. Tetani, . . .	4	
	——	405
		16,113

In addition to the above examinations for the City of Aberdeen, 1,477 examinations were carried out for the North-Eastern Counties within the Laboratory Services Scheme.

CHAPTER VII.

STATISTICAL COMMENTARY.

POPULATION.

The population as estimated at the middle of the year, and including the inmates of Oldmill Hospital and Kingseat Mental Hospital chargeable to Aberdeen, was 160,387 in 1924, as compared with 160,673 in 1923, indicating a decrease of 286. The estimate is based on the census population for 1921; and the subsequent increase or decline is calculated from any change in the number of occupied houses since 1921, the number of such houses being obtainable from the Assessor's Roll.

This method of estimating the population was adopted by the Scottish Registrar-General in 1911, and assumes that the population varies directly with the number of occupied houses in the City. In 1911, this method was tested by application to the figures of previous censuses, and was then found to be satisfactory. In the Report of the Medical Officer of Health for the years 1922-3, however, it is shown that war and post-war conditions, and, in particular, the acute shortage of houses in the City, make this method of estimating the population particularly unreliable at the present time.

Prior to 1911 the method in use by the Registrar-General of estimating the population was based on the assumption that the rate of increase or decrease shown by censal figures which occurred during the previous intercensal period continues during the subsequent post-censal period, and was carried out by calculating a series in geometrical progression starting with the most recent census population and having a difference proportional to the intercensal rate of increase or decrease. In the special circumstances of the present time, it is considered that an estimate of population based on the geometrical decrease is more likely to approximate to the actual facts. Estimated in this way by logarithms, the population of Aberdeen in 1924 was 158,297, as compared with 158,835 in 1923, indicating a decrease of population of 538 for the year.

In order to elucidate the matter further, an estimate of the population of Aberdeen has been made for each year since the 1921 census by adding the excess of births over deaths and subtracting the decrease of population lost by emigration, as obtained from the local emigration agents, and adjusting the previous year's estimate accordingly. Estimated in this fashion, the population of Aberdeen in 1924 was 155,133, as compared with 156,598 in 1923, being a decrease of 1,465 for the year.

While the above considerations would appear to indicate that the various rates referred to in the text should be calculated either on the basis of the geometrical decrease, or better by adding the excess of births over deaths and subtracting the decrease of population lost by emigration, as being nearer the truth, nevertheless, in the interest of uniformity, the population figure of 160,387 for 1924, as estimated by the Registrar-General from the number of inhabited houses, has been retained as a basis for calculating the various rates in this Report.

The accompanying table gives the percentage and number of the population at each of the principal age-periods.

TABLE XIX.—ABERDEEN.—POPULATION AT VARIOUS AGE-PERIODS—1924.

(As estimated from Proportions at Census of 1921.)

		Under 1 year.	1 and under 5 years.	5 and under 15 years.	15 and under 25 years.	25 and under 45 years.	45 and under 65 years.	65 years and upwards.	ALL AGES.
Percentage of Population at each Age (according to Census) .	1911	2·23	9·03	22·13	19·13	26·84	15·31	5·33	...
	1921	2·35	6·66	19·41	20·00	27·00	18·42	6·16	...
Estimated Population at each Age-Period in . .	1924	3,769	10,682	31,131	32,077	43,305	29,543	9,880	**160,387**

BIRTHS.

(Table XX.)

The annual number of births as stated in Table XX. has been corrected since the year 1911 by in-transfers of all births outside the City occurring among women whose usual place of residence was inside the City, and by out-transfers among women within the City whose usual place of residence was outside the City. It is not unusual for the prospective mothers of illegitimate children to come into the City for the purpose of being confined. On the other hand, since the establishment of Oldmill Hospital outside the City boundaries, the births taking place within Oldmill Hospital fall naturally to be added to the births in the City, since the mothers belong to the City. These transfers have been undertaken by the Registrar-General, and it is possible from his reports to obtain the corrected numbers.

Thus estimated, the total number of births during the year 1924 was 3,437, equivalent to a rate of 21·4 per 1,000 of the population. In 1923, the birth-rate was 23·4; in 1922, 24·7; and in 1921, 26·6. In 1920, the birth-rate was 30·3 per 1,000 of the population—a birth-rate that was remarkable in that it exceeded the birth-rate of 27·6 for 1906, uncorrected for transfers, from which year the birth-rate of the City steadily declined to 16·8 per 1,000 in 1918.

The increase of human fertility which had its maximum expression during the first half of 1920, when the birth-rate was 33·8 per 1,000 of population, has, with few exceptions, been experienced in the years immediately succeeding former periods of war. The coincident period of trade prosperity in 1919-1920 was brief, while the trade depression which has been continuous since 1921 and which has been accompanied by decline in the marriage-rate from 13·9 and 13·2 in 1919 and 1920 respectively to 10·9, 10·1, 9·7 and 9·1 in 1921, 1922, 1923 and 1924 respectively, indicates the influence of economic conditions in determining the birth-rate. A study of the birth-rate figures from 1856 to 1924, however, reveals the fact that fluctuations in human fertility occur independently of known local or national influences.

Proportion of Males to Females.—The number of male infants to every 100 female infants born in Aberdeen during each of the past ten years was as follows:—

Year.	Males to 100 females.	Year.	Males to 100 females.
1915	101	1920	104
1916	101	1921	106
1917	102	1922	100
1918	105	1923	95
1919	105	1924	106

The proportion of males to females has varied from 95 males to 100 females in 1923 to 106 males to 100 females in 1921 and 1924.

Illegitimate Births.—In 1924, the number of illegitimate births, after correction for transfers, was 248, and amounted to 7·2 per cent. of the total births, being the lowest percentage of illegitimate births recorded since registration began. The average rate for the 1919-1923 quinquennium was 9·3.

*Births in Proportion to Women of Child-bearing Ages (*15-45 *years).*—The ordinary method of stating the birth-rate in proportion to the total population does not afford so accurate a measure of the fertility of the population as when the births are compared with the number of women of fertile ages in the population. The fertile period is usually assumed to extend from the age of 15 to the age of 45. Thus estimated, the number of legitimate births among married women in 1924 amounted to 183 per 1,000 of such women at the ages specified. In 1923, the rate was 200.

Similarly stated, the illegitimate birth-rate among unmarried and widowed women of the fertile ages was 10·2 per 1,000 in 1924. In 1923, it was 12·0.

Still-Births.—Information regarding still-births has been made increasingly available since the adoption of the Notification of Births Act by the Town Council in June, 1909. During 1924, the notification of still-births may be regarded as fairly complete, the notifications being made by the doctors and midwives in attendance. The number of registered births, the number of still-births, and the still-birth rate per 1,000 of registered births, for the years 1919 to 1924 inclusive, were as follows:—

STILL-BIRTHS.

YEAR.	No. of Registered Births (including Oldmill).	No. of Still-births.	Rate per 1,000 Registered Births.
1924	3,555	144	40·5
1923	3,863	159	41·2
1922	4,057	181	44·6
1921	4,336	189	43·6
1920	5,010	170	33·9
1919	3,458	179	51·8
Mean of 1919-1923 . .	4,145	176	42·5

The still-birth rate per 1,000 of registered births would appear to correspond to the higher of similar rates recorded in countries where the notification of still-births has for long been the practice. Such comparisons are unreliable, however, since the height of the figures frequently represents the degree of completeness of notification.

MARRIAGES.

(Tables XX., XXI., and XXII.)

During the year 1924, there were 1,459 marriages within the City, equivalent to a rate of 9·1 per 1,000 of the population. There were 1,564 marriages in 1923 with a rate of 9·7, 1,616 in 1922 with a rate of 10·1, and 1,751 in 1921 with a rate of 10·9, as compared with 2,122 with a rate of 13·2 and 2,235 with a rate of 13·9 in 1920 and 1919 respectively—the years in which the highest marriage-rates were recorded in Aberdeen since civil registration began.

The information contained in Table XXI., in regard to marriages during the years 1913 to 1924 inclusive, is compiled and calculated from the entries of the Registrars, and contains much interesting information relating to sex, status, occupation and residence.

Residence.—In 1924, 967 of the males married were ordinarily resident in Aberdeen, the remaining 492 coming from outwith the City. As regards the females, 1,064 were ordinarily resident in the City, and 395 lived outside the City.

Irregular Marriages.—The number of irregular marriages in 1924 was 285, the average annual number during the 1919-1923 quinquennium being 446.

Status.—In the 1,459 marriages in 1924, the persons married included 143 widowers and 98 widows.

TABLE XX.—ABERDEEN.—MARRIAGE, BIRTH, AND DEATH-RATES—1856 TO 1924.
Per 1,000 of population.

Year.	Population.	Marriages.		Births.†			Deaths.‡			Excess of Birth-Rate over Death-Rate.
		Number.	Rate per 1,000 of Population.	Number.	Rate per 1,000 of Population.	Illegit. Births per 100 Total Births.	Number.	Rate per 1,000 of Population.	Average Age at Death.	
1924	**160,387**	**1,459**	**9·1**	**3,437**	**21·4**	**7·2**	**2,302**	**14·4**	**44·7**	**7·0**
1923	160,673	1,564	9·7	3,766	23·4	7·7	2,157	13·4	45·1	10·0
1922	160,536	1,616	10·1	3,969	24·7	9·7	2,595	16·2	41·5	8·5
1921	159,915	1,751	10·9	4,254	26·6	9·2	2,292	14·3	44·1	12·3
1920	160,466	2,122	13·2	4,868	30·3	9·3	2,398	14·9	40·1	15·4
1919	161,017	2,235	13·9	3,379	21·0	10·6	2,469	15·3	43·4	5·7
Mean of 1919-1923	**160,521**	**1,858**	**11·6**	**4,047**	**25·2**	**9·3**	**2,382**	**14·8**	**42·8**	**10·4**
1918	161,568	1,626	10·1	2,721	16·8	11·4	2,573	15·9	40·6	0·9
1917	162,119	1,341	8·3	2,880	17·8	11·8	2,387	14·7	41·2	3·1
1916	162,670	1,446	8·9	3,546	21·8	10·1	2,367	14·6	43·3	7·2
1915	163,222	1,878	11·5	3,784	23·2	10·0	3,075	18·8	36·3	4·4
1914	163,773	1,536	9·4	4,006	24·5	9·4	2,752	16·8	39·5	7·7
Mean of 1914-1918	**162,670**	**1,565**	**9·6**	**3,387**	**20·8**	**10·5**	**2,631**	**16·2**	**40·2**	**4·7**
1916-1920	**161,568**	**1,754**	**10·9**	**3,479**	**21·5**	**10·6**	**2,439**	**15·1**	**41·7**	**6·5**
1911-1915	**164,324**	**1,489**	**9·1**	**3,959**	**24·1**	**10·2**	**2,752**	**16·8**	**38·1**	**7.4**
1906-1910	**163,620**	**1,360**	**8·3**	**4,505**	**27·5**	**9·7**	**2,512**	**15·4**	**37·6**	**12·2**
1901-1905	**158,082**	**1,428**	**9·0**	**4,872**	**30·8**	**8·5**	**2,763**	**17·5**	**34·9**	**13·3**
1896-1900	**145,740**	**1,356**	**9·3**	**4,636**	**31·8**	**8·3**	**2,644**	**18·1**	**33·3**	**13·7**
1891-1895	**131,627**	**1,099**	**8·4**	**4,114**	**31·3**	**9·8**	**2,539**	**19·3**	**32·9**	**12·0**
1886-1890	**117,587**	**911**	**7·8**	**3,827**	**32·5**	**10·4**	**2,370**	**20·2**	...	**12·3**
1881-1885	**108,959**	**848**	**7·8**	**3,712**	**34·1**	**10·6**	**2,159**	**19·8**	...	**14·3**
1876-1880	**100,419**	**788**	**7·9**	**3,480**	**34·7**	**10·9**	**2,100**	**20·9**	...	**13·8**
1871-1875	**91,941**	**705**	**7·7**	**3,169**	**34·5**	**12·1**	**2,063**	**22·4**	...	**12·1**
1866-1870	**84,234**	**684**	**8·1**	**3,010**	**35·7**	**12·9**	**1,978**	**23·5**	...	**12·2**
1861-1865	**77,040**	**624**	**8·1**	**2,663**	**34·6**	...	**1,915**	**24·9**	...	**9·7**
1856-1860	**73,458**	**524**	**7·1**	**2,397**	**32·6**	...	**1,772**	**24·1**	...	**8·5**

† Corrected for transferred births for 1911 and subsequent years.
‡ Corrected for transferred deaths for 1904 and subsequent years.

TABLE XXI.—ABERDEEN.—NUMBER OF MARRIAGES IN YEARS 1913-24.

	YEAR.											
	1924.	1923.	1922.	1921.	1920.	1919.	1918.	1917.	1916.	1915.	1914.	1913.
A.—MEN.												
Status :—												
BACHELORS, . . .	1316	1426	1449	1605	1916	2043	1475	1208	1316	1740	1399	1221
WIDOWERS, . . .	143	138	167	146	206	193	150	133	130	138	137	127
ALL, . . .	1459	1564	1616	1751	2122	2236	1625	1341	1446	1878	1536	1348
Occupation :—												
Labouring and Artisan, .	1001	1113	1110	1260	1609	1637	1175	986	1090	1472	1158	981
Commercial, . . .	274	286	334	314	288	325	256	195	288	298	292	283
Professional, . . .	183	165	170	176	224	273	186	148	61	102	79	78
Other or No Occupation,	1	0	2	1	1	1	8	12	7	6	7	6
Residence :—												
In Aberdeen, . . .	967	1073	1083	1190	1427	1411	1001	820	1046	1304	1137	957
Not in Aberdeen, . .	492	491	533	561	695	825	624	521	400	574	399	391
B.—WOMEN.												
Status :—												
SPINSTERS, . . .	1361	1465	1498	1605	1931	2026	1480	1249	1340	1794	1451	1280
WIDOWS, . . .	98	99	118	146	191	210	145	92	106	84	85	68
ALL, . . .	1459	1564	1616	1751	2122	2236	1625	1341	1446	1878	1536	1348
Occupation :—												
Domestic Servants, .	323	326	374	347	397	502	369	348	401	487	370	334
Dressmakers & Milliners,	49	61	79	118	108	112	115	95	83	123	83	93
Workers in other Workshops and in Factories,	476	517	466	509	707	720	534	439	430	628	567	486
Saleswomen (incl. Dealers)	129	158	158	208	221	199	155	120	104	135	107	90
Clerks and Typists, .	115	139	121	133	127	122	101	71	73	80	61	41
Teachers and Nurses, .	96	77	100	99	102	92	76	75	87	72	60	63
Other Occupation, . .	33	38	30	19	35	43	45	21	23	14	14	12
No stated Occupation, .	238	248	288	318	425	446	230	172	245	339	274	229
Residence :—												
In Aberdeen, . . .	1064	1201	1180	1348	1586	1721	1273	1061	1128	1433	1255	1070
Not in Aberdeen, . .	395	363	436	403	536	515	352	280	318	445	281	278
IRREGULAR MARRIAGES.												
Number, ...	285	306	367	399	537	620	471	411	476	685	261	133
Percentage, . . .	19·5	19·6	22·7	22·8	25·3	27·7	29·0	30·6	32·9	36·5	17·0	9·9

Occupations of Men.—Of the total marriages in 1924, 1,001 were of men belonging to the labouring and artisan classes, these classes forming by far the largest group of occupied males. In the commercial classes there were 274 marriages; and in the professional classes, 183.

Occupations of Women.—Women employed in workshops and factories form the largest group of women engaged in known occupations, and as usual the greatest number of marriages took place among this class of workers in 1924, the number being 476. The next largest group was that of domestic servants, with 323 marriages. The third group was that of women without stated occupation, in which group there were 238 marriages. Next came saleswomen (including dealers), with 129 marriages; clerks and typists, with 115 marriages; teachers and nurses, with 96; and dressmakers and milliners, with 49.

Probability of Marriage.—Analysing the number of marriages, it was formerly argued that the men who most frequently married were those engaged in occupations in which a period of training is not required or is completed at a comparatively early age of life, with the result that the rates of wages for adults in such occupations are soon available, thus permitting of early marriage. So, also, marriages were commonly held to be more rare among men occupied in such work as necessitates training to a later age-period, and whose opportunity of earning an income permitting of marriage is accordingly delayed. Analysing marriage returns some forty-five years ago, Dr. Farr demonstrated, among other things, that, while the number of marriages in a nation fluctuated independently of external causes, marriage returns increased as a result of peace after war and during periods of prosperity, and diminished during war and during periods of industrial depression. At the same time Farr pointed out that in periods of industrial depression the decline in the marriage-rate affected almost wholly the labouring and artisan population. At first sight, the Aberdeen marriage returns relating to the recent war and post-war periods appear to support Farr's deductions. Thus, the marriage-rates of 13·9 per 1,000 of the population in Aberdeen in 1919 has fallen to 9·1 per 1,000 of population in 1924; and Table XXI. indicates that the diminution in the number of marriages among labourers and artisans was responsible for a large part of this decline in the marriage-rate.

Percentages of Marriages.—It must clearly be recognised, however, that the number of marriages in each occupation group gives no indication of the opportunity of marriage to men in different occupation groups, or of the chance of marriage belonging to women in the different groups. To measure the probability of marriage, it is necessary to measure the number of marriages against the total number of men and women respectively belonging to each occupation group per 100 of such men and women. The following table indicates the relative percentages of marriages in the various groups:—

TABLE XXII.—ABERDEEN.—PERCENTAGE OF MARRIAGES OF PERSONS EMPLOYED IN DIFFERENT OCCUPATIONS.

A. MEN.

Occupation.	No. employed in Aberdeen (Census 1921).	No. of Marriages Registered in Aberdeen.					Percentage to No. employed.				
		1924	1923	1922	1921	1920	**1924**	1923	1922	1921	1920
(1) Labouring and Artisan,	36,661	**1001**	1113	1110	1260	1609	**2·7**	3·0	3·0	3·4	4·4
(2) Commercial, . .	8,522	**274**	286	334	314	288	**3·2**	3·4	3·9	3·7	3·4
(3) Professional, . .	4,516	**183**	165	170	176	224	**4·1**	3·6	3·8	3·9	5·0

B. WOMEN.

Occupation.	No. employed in Aberdeen (Census 1921).*	No. of Marriages Registered in Aberdeen.					Percentage to No. employed.				
		1924	1923	1922	1921	1920	**1924**	1923	1922	1921	1920
(1) Domestic Servants (including Waitresses and Laundry Workers)	4200	**323**	326	374	347	397	**7·7**	7·8	8·9	8·3	9·5
(2) Workers in Workshops and Factories (excluding Dressmakers, Milliners, and Laundry Workers), . .	7303	**476**	517	466	509	707	**6·5**	7·1	6·4	7·0	9·7
(3) Saleswomen (including Dealers), . . .	2710	**129**	158	158	208	221	**4·8**	5·8	5·8	7·7	8·2
(4) Teachers and Nurses, .	1797	**96**	77	100	99	102	**5·3**	4·3	5·6	5·6	5·7
(5) Clerks and Typists, .	3144	**115**	139	121	133	127	**3·7**	4·4	3·8	4·2	4·0
(6) Dressmakers and Milliners, ...	1613	**49**	61	79	118	108	**3·0**	3·8	4·9	7·3	6·7
(7) Other Occupations, .	2667	**33**	38	30	19	35	**1·2**	1·4	1·1	0·7	1·3
(8) No stated Occupation,	16,600	**238**	248	288	318	425	**1·4**	1·5	1·7	1·9	2·6

* Excluding Married Women.

Reference to the figures of the percentages of marriages of men employed in different occupations, as set forth in Table XXII., shows that the percentage of marriages is greatest in the professional classes, and that the influence of war and trade depression affects all classes.

As regards women, the chance of marriage would appear to be greatest among domestic servants, who provide the highest percentage of marriages.

The factors determining the chance of marriage in the various occupation groups are obviously very complex, but information concerning such factors as age distribution and social circumstances in the various occupational groups is too meagre to permit of detailed analysis.

DEATHS.

(Table XX.)

The total number of deaths during 1924 was 2,302, equivalent to a death-rate of 14·4 per 1,000 of the population. For the quinquennium 1919-1923, the average annual number of deaths was 2,382, with a rate of 14·8.

These rates have been obtained after adjustment for the transfers, between this and other districts, of deaths of persons occurring in districts outside their usual place of residence. In Table XX., and in all the other tables in which deaths or death-rates are given, the numbers have been corrected for these transfers since the beginning of 1904.

The death-rate of 14·4 per 1,000 of population for 1924 was somewhat higher than the death-rate of 13·4 for 1923, which is the lowest Aberdeen death-rate yet recorded, the previous lowest being one of 14·2, which occurred in 1910. At the commencement of civil registration, about 70 years ago, the death-rate in Aberdeen was about 24 to 25, so that the rate at the present time is slightly more than half of what it was in these earlier times.

The Average Age at Death of all persons dying during 1924 was 44·7 years. In the 1919-1923 quinquennium it was 42·8 years. As the average for the five years 1891-1895 was 32·9 years, there has been since 1891-1895 an extension of the age at death of about twelve years.

Excess of Birth-Rate over Death-Rate.—In Table XX. will be found a column giving the excess of the birth-rate over the death-rate since the commencement of registration. The excess in 1924 was 7·0. For the quinquennium 1919-1923 the excess was 10·4. The usual excess of birth-rate over death-rate for many years prior to 1911 was about 11 to 14.

ANALYSIS OF THE DEATH-RATE.

Mortality in Relation to Age and Causes (Tables XVI., XXIII., and XXIV.).

Infant Mortality.—This is dealt with in detail in the section of this Report relating to Maternity and Child Welfare Services.

Mortality at Pre-School Age-Period (1 to 5 years), excluding Infant Period (Tables XVI., XXIII., and XXIV.).—The number of deaths at this age-period was 207, equivalent to a death-rate of 19·4 per 1,000 of the population at this age; while the average rate for the 1914-1923 decennium was 18·4. In 1924, the excessive mortality was wholly due to deaths from whooping-cough, measles, and tuberculous meningitis, there being 24 deaths from the last-mentioned cause as against an average of 10 during the preceding quinquennium.

Mortality at School Age-Period (5 to 15 years) (Tables XXIII. and XXIV.).—The deaths at this age-period amounted to 47, or 1·5 per 1,000 of population at this age. As will be seen from Table XXIII., the mortality at this age-period continues at a low level, and the decline noted in recent years is being maintained. The lowering of mortality is particularly noticeable in the group of ordinary zymotic diseases. It is obvious, also, that while there has been no increase of any moment in the tuberculosis death-rate in this age-period in 1924 to correspond with the increase noted in the earlier years of life, nevertheless the remarkable and continuous diminution of grave tuberculous disease in children in the 5-15 year period has meantime been arrested.

Mortality at Adolescent Age-Period (15 to 25 years) (Tables XXIII. and XXIV.).—The deaths at this age-period were 82, or 2·6 per 1,000 of the population, being the lowest death-rate recorded at this age-period since civil registration began. The average mortality-rate for the preceding ten years was 3·8 per 1,000 of the population. The lowering of this mortality is due to the diminution of the common zymotics and tuberculosis.

Mortality at Early-Mature Age-Period (25 to 45 years) (Tables XXIII. and XXIV.).—The number of deaths at this age-period was 206, giving a rate of 4·8 per 1,000 of the population, which is substantially below the average for the preceding ten years (6·5). The rate for 1924 is, along with that for 1923, the lowest recorded since civil registration began.

Mortality at Late-Mature Age-Period (45 to 65 years) (Tables XXIII. and XXIV.).—The deaths amounted to 448, with a rate of 15·2 per 1,000 of the population at this period, as compared with an average rate of 17·9 for the preceding decennium. The rate for 1924 is the lowest recorded since civil registration began. It is interesting to note that the decline in the mortality in this age-period in 1924 was due to a diminished number of deaths from apoplexy, diseases of the digestive system, and malignant diseases. It can scarcely be expected that a diminution of mortality from these diseases will be maintained in future years.

Mortality at Post-Mature Age-Period (65 years and upwards) (Tables XXIII and XXIV.).—The deaths amounted to 891, with an equivalent rate of 90·2 per 1,000 of the population, as compared with an average of 84·6 for the 1914-1923 decennium. By far the most common cause of death at this period was diseases of

TABLE XXIII.—ABERDEEN.—MORTALITY FROM ALL CAUSES AT VARIOUS AGE-PERIODS *
(per 1,000 of population at each age).

Year.	INFANTILE MORTALITY. Deaths of Infants under 1 year per 1,000 Births.	AGE PERIOD.						All Ages.
		0—5 years. (Pre-School Period.)	5—15 years. (School Period.)	15—25 years. (Adolescent Period)	25—45 years. (Early Mature Period.)	45—65 years. (Late Mature Period.)	65 years and upwards. (Post-mature Period.)	
1924 . .	122	43·5	1·5	2·6	4·8	15·2	90·2	14·4
1923 . .	104	37·8	1·3	2·8	4·8	15·5	82·1	13·4
1922 . .	133	56·1	2·0	2·8	5·9	17·4	87·4	16·2
1921 . .	108	37·5	2·4	3·6	5·9	16·9	82·2	14·3
1920 . .	121	49·6	2·2	3·8	6·7	16·1	73·6	14·9
1919 . .	118	36·6	3·2	4·4	6·7	17·2	91·7	15·3
Mean of 1919-1923 (Five years).	117	43·5	2·2	3·5	6·0	16·6	83·4	14·8
1918 . .	143	41·9	3·6	5·4	7·8	17·3	83·8	15·9
1917 . .	139	41·6	2·9	3·2	6·2	17·5	80·6	14·7
1916 . .	112	35·1	2·8	3·4	6·4	18·9	84·1	14·6
1915 . .	173	62·5	4·5	4·1	7·0	21·3	91·8	18·8
1914 . .	121	43·0	5·6	4·5	7·2	20·4	88·3	16·8
Mean of 1914-1918 (Five years).	138	44·8	3·9	4·1	6·9	19·1	85·7	16·2
1916-1920 .	127	41·0	2·9	4·0	6·8	17·4	82·8	15·1
1911-1915 .	143	49·7	4·0	4·1	6·7	20·0	86·5	16·8
1906-1910 .	128	42·5	2·9	3·5	7·0	19·5	84·2	15·4
1901-1905 .	143	52·2	3·1	4·6	7·4	21·3	83·3	17·1
1896-1900 .	144	54·2	3·4	5·0	9·2	22·2	81·6	18·1
1891-1895 .	147	57·5	4·5	5·8	9·3	22·7	86·5	19·3
1886-1890 .	140	52·9	4·8	7·0	10·5	22·9	88·1	20·2
1881-1885 .	126	50·9	5·4	6·4	10·1	23·8	86·3	19·8
1876-1880 .	129	53·1	6·2	7·7	11·3	22·1	86·6	20·9
1871-1875 .	133	57·5	7·7	8·2	12·0	22·6	91·5	22·4
1866-1870 .	133	68·0	7·2	8·9	12·4	22·2	91·2	23·5
1861-1865 .	130	68·9	8·1	10·5	13·4	24·7	98·7	24·9
1856-1860 .	126	67·8	9·3	9·8	12·6	21·8	97·5	24·1

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* Corrected for transferred deaths in 1904 and subsequent years.

Table XXIV.—Aberdeen.—Mortality at Various Age-Periods from Various Causes.

(Corrected for transferred deaths.)

A.—Number of Deaths—Year 1924.

Age.	All Causes.	Zymotic Diseases.			Tuberculous Diseases.		Respiratory Diseases.			Diseases of Circulatory System	Diseases of Genito-Urinary System.	Nervous Diseases.			Dis. of Digest. Syst. incl. Diarrhœa.	Malignant Diseases.	Developmental Diseases (ex. old age)	Accident and Violence.	Debility, Atrophy, Inanition		Miscellaneous.
		Ordinary.	Venereal.	Septic.	Respiratory.	Other Tuberculous	Pneumonia.	Bronchitis.	Other Respiratory.			Cereb. Haem., Thrombosis, Embolism, & Hemip.	Convulsions	Other Nervous.					Under age of 1 year.	Above age of 65 years.	
Under 1 year,	421	58	7	2	4	7	45	32	3	0	1	0	29	7	28	1	107	9	68	...	13
1—5 years,	207	86	0	1	1	35	26	6	2	0	1	0	6	9	6	2	2	20	...	...	4
5—15 ,,	47	7	0	0	2	10	4	0	1	8	0	0	0	2	5	1	0	4	...	...	3
15—25 ,,	82	6	0	0	29	5	5	0	1	8	4	2	0	5	4	2	0	5	...	..	6
25—45 ,,	206	12	0	1	56	6	15	2	4	17	9	9	0	9	6	25	0	11	...	...	24
45—65 ,,	448	10	2	1	38	5	23	21	7	91	37	39	0	23	19	88	0	25	...	...	19
65 + ,,	891	23	1	4	13	2	24	73	19	215	44	156	0	15	31	110	0	17	...	110	34
All Ages, .	2302	202	10	9	143	70	142	134	37	339	96	206	35	70	99	229	109	91	68	110	103

B.—Death-Rate per 100,000 of Population at Each Age—Year 1924.

Age.	All Causes.	Zymotic Diseases.			Tuberculous Diseases.		Respiratory Diseases.			Diseases of Circulatory System	Diseases of Genito-Urinary System.	Nervous Diseases.			Dis. of Digest. Syst. incl. Diarrhœa.	Malignant Diseases.	Developmental Diseases (ex. old age)	Accident and Violence.	Debility, Atrophy, Inanition		Miscellaneous.
		Ordinary.	Venereal.	Septic.	Respiratory.	Other Tuberculous	Pneumonia.	Bronchitis.	Other Respiratory.			Cereb. Haem., Thrombosis, Embolism, & Hemip.	Convulsions	Other Nervous.					Under age of 1 year.	Above age of 65 years.	
Under 1 year,	11170	1539	186	53	106	186	1194	849	80	0	27	0	769	186	743	27	2839	239	1805	...	345
1—5 years,	1938	805	0	9	9	328	244	56	19	0	9	0	56	84	56	19	19	188	...	...	38
5—15 ,,	151	22	0	0	6	32	13	0	3	26	0	0	0	6	16	3	0	13	...	...	10
15—25 ,,	256	19	0	0	90	16	16	0	3	25	12	6	0	15	12	6	0	16	...	...	19
25—45 ,,	476	28	0	2	129	14	35	5	9	39	21	21	0	21	14	57	0	25	...	...	55
45—65 ,,	1517	34	7	3	129	17	78	71	24	308	125	132	0	78	64	298	0	85	...	...	64
65 + ,,	9018	233	10	40	132	20	243	739	192	2176	445	1579	0	152	314	1113	6	172	...	1113	344
All Ages, .	1435	126	6	6	89	44	89	84	23	211	60	128	22	44	62	143	68	57	...	..	64

C.—Death-Rate per 100,000 of Population at Each Age—Average for Ten Years—1914-1923.

Age.	All Causes.	Zymotic Diseases.			Tuberculous Diseases.		Respiratory Diseases.			Diseases of Circulatory System	Diseases of Genito-Urinary System.	Nervous Diseases.			Dis. of Digest. Syst. incl. Diarrhœa.	Malignant Diseases.	Developmental Diseases (ex. old age)	Accident and Violence.	Debility, Atrophy, Inanition		Miscellaneous.
		Ordinary.	Venereal.	Septic.	Respiratory.	Other Tuberculous	Pneumonia.	Bronchitis.	Other Respiratory.			Cereb. Haem., Thrombosis, Embolism, & Hemip.	Convulsions	Other Nervous.					Under age of 1 year.	Above age of 65 years.	
Under 1 year,	12553	1152	347	43	56	220	1430	944	94	19	16	21	647	195	1464	3	3124	177	2246	..	356
1—5 years,	1835	770	3	4	45	205	306	57	15	7	16	4	68	45	117	4	12	99	...	...	58
5—15 ,,	305	95	0·3	1	22	43	25	2	2	16	9	1	1	20	22	1	2	22	...	...	18
15—25 ,,	379	44	0·3	3	115	24	26	2	4	30	9	0·3	0	24	24	6	1	28	...	..	37
25—45 ,,	646	60	3	5	165	12	49	11	6	59	36	13	0	43	35	44	0·4	43	...	...	62
45—65 ,,	1786	74	2	13	131	12	100	81	28	310	126	211	0	71	102	326	0	69	...	..	129
65 + ,,	845	262	4	33	56	12	347	908	129	1804	441	1363	0	142	288	928	0	195	...	1257	286
All Ages, .	1550	157	10	8	103	40	117	98	19	187	63	122	20	49	96	126	74	56	...	...	80

the circulatory system, accounting for about one-fourth of all the deaths; apoplexy was responsible for about one-sixth of the deaths; and malignant disease accounted for about one-eighth of the deaths.

Mortality at all Ages (Tables XX., XXIII., and XXIV.).—The death-rate from all causes has already been referred to.

The percentage fall in the death-rate from the decade of 1861-1870 up to the end of 1924 is for each age-period as follows, namely:—36 for the pre-school (including the infant) period, 80 for the school period, 73 for the adolescent period, 63 for the early-mature period, 35 for the late-mature period, and 5 for the post-mature period.

During 1924, the diseases responsible for the largest number of deaths were as follows:—Diseases of circulatory system, 339 deaths; malignant diseases, 229; cerebral hæmorrhage, 206; and ordinary zymotics, 202.

VARIATIONS IN MORTALITY FROM SELECTED CAUSES SINCE 1856.

The variations in the mortality from selected causes at all ages since the year 1856—the second year of civil registration—can be conveniently followed in Table I.

Infectious Diseases.—These, including tuberculosis, are dealt with in greater detail in the part of the Report devoted especially to infectious diseases.

Cancer and Other Malignant Diseases.—Chapter II. of this Report deals specially with various aspects of the mortality from these diseases, and describes the educational propagandism in connection with cancer recently undertaken in the City of Aberdeen.

Pneumonia.—The death-rate from pneumonia was 89 per 100,000 of the population, as against an average of 110 during the 1919-1923 quinquennium.

Bronchitis, which has been an almost steadily declining cause of death since near the commencement of civil registration, gave a death-rate of 84 per 100,000 of the population, thus showing an increase on the rate for 1923 (67), although the average for the 1919-1923 quinquennium was 93.

Diseases of the Digestive System.—There has throughout the registration period been a decided tendency for the death-rate from diseases of the digestive system to decline, and the rate for 1924 (62 per 100,000 of population) is the lowest yet recorded. The average for the 1919-1923 quinquennium was 83 per 100,000.

Diseases of the Circulatory System.—Deaths from these diseases continue to show a tendency to increase, the death-rate for 1924 being 211 per 100,000 of population, as against an average of 184 for the preceding five years. The increase since the commencement of registration is probably largely, if not wholly, due to the increasing proportion of the population surviving to the later ages, in which circulatory diseases always take a prominent place among the causes of death, owing to the slow degeneration so commonly met with in the walls of the blood vessels of persons beyond middle life.

STATISTICAL DATA RELATIVE TO THE VARIOUS MUNICIPAL WARDS.

Table XXV. shows the birth-rate, infantile mortality, and death-rates in the various wards of the City during 1924. It is hoped to analyse in detail the statistical data relative to all the wards of the City in a subsequent Report. Meantime three different types of wards are selected for comparison, namely:—(*a*) Rubislaw, giving data for a west-end population of the better class; (*b*) Torry, data for a working-class population living in modern tenements under good sanitary conditions; and (*c*) Greyfriars, a poor population living in somewhat dilapidated property.

The table shows that in comparing Rubislaw and Torry from a health point of view, there is a balance in favour of Torry, particularly in respect of the much greater surplus of births over deaths. Greyfriars shows a distinctly worse record than Rubislaw and Torry, its death-rate being substantially higher. As regards the death-rates from zymotic diseases and from tuberculosis, Rubislaw is easily the lowest and Greyfriars the highest. All such comparisons, however, are unreliable in the absence of corrections for age and sex distribution of ward populations.

COMPARISON BETWEEN ABERDEEN AND OTHER TOWNS.

Two tables (XXVI. and XXVII.) are submitted, in which comparison is made between Aberdeen and other large towns in Scotland in regard to some of the more important features of their vital statistics.

The rates for births and deaths are corrected for transfers, that is, for births or deaths transferred from the records in the place of their occurrence to the records of the place of home residence.

A further correction is applied to the death-rate from all causes. This correction is necessary to a strict comparison between the towns, owing to the differences in sex and age distribution.

Marriages.—Table XXVI. shows that, among the principal towns, Aberdeen occupied the second highest place, with a rate of 92 per 10,000 of population. Edinburgh was first, with a marriage-rate of 93; and Glasgow, Dundee, Greenock, and Paisley had marriage-rates of 84, 76, 60, and 59 respectively.

As has been pointed out in previous reports, the marriage-rate for the larger towns is inflated beyond its proper dimensions by the inclusion of a considerable number of marriages of people whose residence is beyond the City.

Table XXV.—Aberdeen.—Birth-Rates and Death-Rates from Various Causes.—*Year* 1924.

(Distributed according to Wards of City.)

	Whole City.	Ward of City.										
		Woodside.	St. Machar.	St. Andrew's.	St. Clement's.	Grey-friars.	St. Nicholas.	Rose-mount.	Rubislaw.	Ruth-rieston.	Ferryhill.	Torry.
Population (in thousands), Census 1921,	159·0	9·5	14·3	17·6	11·2	13·7	14·5	16·6	19·0	16·4	14·7	11·3
Birth-Rate, per 1,000 of Population,	21·4	20·9	20·2	24·8	27·6	36·1	24·3	21·0	10·0	15·4	16·6	28·7
Infantile Mortality, per 1,000 Births,	122	80	104	122	181	152	151	89	105	95	135	93
Death-Rate, per 100,000 of Population—All Causes,	1437	1368	1168	1278	1545	2029	1510	1487	1384	1567	1388	1230
Zymotic Diseases—												
Ordinary,	126	63	98	165	214	234	138	90	74	98	102	150
Venereal,	6	0	14	0	18	7	14	0	0	0	14	9
Septic,	6	0	7	0	0	7	7	24	0	0	7	9
Tuberculous Diseases—												
Respiratory,	89	95	84	85	45	131	117	114	84	79	68	80
Other Tuberculous,	44	11	77	28	63	58	76	54	26	31	20	44
Respiratory Diseases—												
Pneumonia,	89	84	77	68	71	212	145	84	42	67	68	88
Bronchitis,	84	137	48	57	125	110	90	97	74	55	109	62
Other Respiratory,	23	32	7	28	9	51	28	36	26	18	7	9
Diseases of Circulatory System,	211	189	105	171	179	212	152	253	290	335	259	133
Diseases of Genito-Urinary System,	60	42	42	63	54	58	48	90	74	55	75	44
Nervous Diseases—												
Cerebral Haemorrhage, &c.	128	136	49	74	98	153	96	151	195	220	109	115
Convulsions,	22	21	14	34	45	15	48	6	0	30	20	18
Other Nervous,	44	21	49	62	45	51	41	60	37	55	27	18
Diseases of Digestive System, including Diarrhœa,	62	84	77	57	71	66	41	48	58	67	82	44
Malignant Diseases,	143	95	105	137	125	197	138	140	179	189	102	150
Developmental Diseases (excluding old age),	68	74	42	85	62	153	76	60	36	37	61	88
Accidents and Violence,	57	42	56	51	53	88	69	36	42	49	88	62
Other Causes,	175	242	217	113	268	226	186	144	147	182	170	107

Births.—In respect of births, Aberdeen and Paisley came fourth in the list, with a birth-rate of 216. The town with the highest birth-rate was, as in the preceding year, Greenock, with 242.

Illegitimate Births.—The percentage of illegitimate births in the total births was distinctly higher in Aberdeen and Dundee than in any of the other principal towns, being 7·2 in both of these towns, as against 6·3 in Edinburgh, 5·9 in Glasgow, 4·8 in Greenock, and 4·3 in Paisley. Stated as births per 1,000 unmarried and widowed women of child-bearing ages (15 to 45 years), Aberdeen, along with Dundee, with 10·2, was the highest of the principal towns, Glasgow and Greenock coming next, with 10·1, then Edinburgh, with 7·5, and Paisley was lowest, with 6·0.

Deaths.—As regards the crude death-rate from *all causes* and at all ages, Aberdeen had the lowest death-rate, with 144 per 10,000 of population, Edinburgh coming next, with a rate of 148. The rates in Greenock, Glasgow, Paisley, and Dundee were 152, 161, 161, and 164 respectively. When this crude death-rate is corrected for age and sex distribution, Aberdeen is still first, with a death-rate of 143; Glasgow has the highest rate, 181, and Paisley, Greenock, Dundee, and Edinburgh have rates of 176, 166, 164, and 150 respectively.

In regard to *Infantile Mortality* (deaths of infants under one year per 1,000 births), Aberdeen occupied, as in preceding years, an unsatisfactory position in comparison with the other five principal Scottish towns, its mortality being the second highest, with 122, Paisley alone being higher, with 139. The town with the lowest infant mortality was Edinburgh, with 89, Greenock coming next, with 113.

In respect of the death-rate for the *Principal Epidemic Diseases*, Aberdeen had the second lowest rate, 10·1 per 10,000 of population, Edinburgh having a rate of 9·4. Paisley had the highest rate, 17·5.

As regards the death-rate from *Tuberculosis of the Respiratory System*, Aberdeen, with 9·0, had a lower rate than Glasgow, Greenock, or Edinburgh, but a higher rate than Dundee or Paisley. From *Other Forms of Tuberculosis*, Aberdeen had the second highest death-rate, 4·3, only Greenock being higher, with 4·4.

As to the death-rate from *Bronchitis*, Aberdeen was above Edinburgh, but lower than the other towns.

As regards *Pneumonia*, Aberdeen had a lower death-rate than any of the other principal towns.

In respect of *Malignant Diseases*, Aberdeen had the fourth lowest rate, the rates for Greenock, Paisley, and Glasgow being lower. The rates in Dundee and Edinburgh were considerably higher. The varying mortality in the principal towns has already been considered in detail in the chapter of this Report relating to Cancer.

The death-rate from *Diseases of the Circulatory System* in Aberdeen (21·0) was third highest, Dundee and Edinburgh having rates of 22·2 and 21·1 respectively. The rates for Greenock, Glasgow, and Paisley were 14·1, 14·5, and 20·1 respectively.

Table XXVI.—Birth, Death, and Marriage Rates during the Year 1924.

Six Principal Towns in Scotland.

(Corrected for transfers of births and deaths.)

	Glasgow.	Edinburgh.	Dundee.	Aberdeen.	Paisley.	Greenock.
Estimated Population, ... *(in thousands).*	1051	426	171	159	87	82
Marriage-Rate, ... *(per 10,000 of population).*	84	93	76	92	59	60
Birth-Rate—						
A—Total Births, ... *(per 10,000 of population).*	241	197	226	216	216	242
B—Legitimate Births, ... *(per 1,000 Married Women aged 15-45 years).*	201	179	199	183	192	205
C—Illegitimate Births—						
(*a*) *Per 100 total Births,*	5·9	6·3	7·2	7·2	4·3	4·8
(*b*) *Per 1,000 Unmarried Women and Widows aged 15–45 years,* . . .	10·1	7·5	10·2	10·2	6·0	10·1
Death-Rate—						
A—All Ages *(per 10,000 of population).*						
(*a*) All Causes, ...	161	148	164	144	161	152
Corrected for Age and Sex Distribution, ...	181	150	164	143	176	166
(*b*) Principal Epidemic Diseases, . .	15·9	9·4	16·9	10·1	17·5	15·2
(*c*) Tuberculosis—						
(1) Respiratory, ...	10·4	9·9	8·5	9·0	7·5	10·0
(2) Other, ...	4·1	3·4	3·8	4·3	3·1	4·4
(*d*) Bronchitis, ...	12·7	8·0	9·9	8·8	10·8	9·4
(*e*) Pneumonia, ...	23·3	13·8	18·2	9·0	19·3	16·2
(*f*) Malignant Diseases, ...	12·7	16·0	15·9	14·6	12·6	11·8
(*g*) Diseases of Circulatory System, .	14·5	21·1	22·2	21·0	20·1	14·1
(*h*) Nephritis and Bright's Disease, .	4·6	3·7	4·0	4·1	4·6	3·4
(*i*) Diarrhœa and Enteritis (under 2 years), ...	2·7	1·3	2·9	1·3	2·0	2·1
(*j*) Violence (excl. Suicide), . .	4·5	4·6	4·9	4·7	4·2	4·4
B—Infants under One Year, ... *(per 1,000 births).*	119	89	120	122	139	113
Excess of Birth-Rate over Death-Rate, .	80	49	62	72	55	90

APPENDIX.

Photographs taken on 4th April, 1925, showing patients receiving helio-therapy in Aberdeen.

(See page 116 of text.)